School Shop

vol. XVI no. 9

MAY 1957

Improving Public Relations
by Robert A. Huston

Operation Dust Pan
by James O. Reynolds

Electronic Applause Meter
by Joseph Murri

Automotive Record Card
by George R. Kinsler

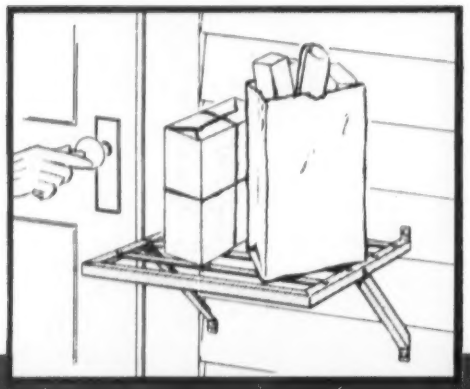
Cover story: Safety concerns this Denver, Colorado, shop student working on a spindle shaper. Note his sleeves are rolled and plastic headpiece shields his face.

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

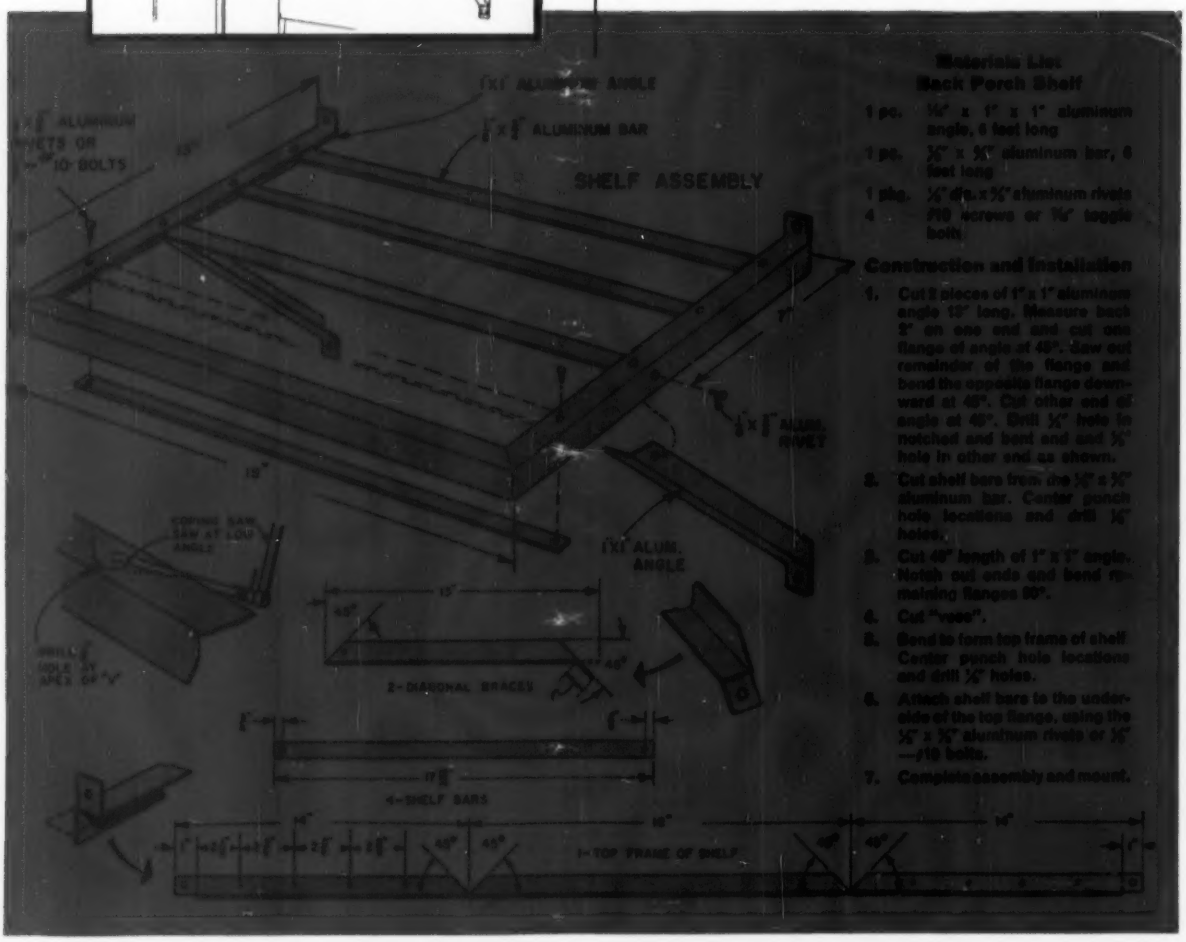
Here's a new aluminum project for your vocational arts class . . .

ALUMINUM BACK PORCH SHELF

with Reynolds *Do-It-Yourself* Aluminum



Give your students the thrill of working with the *modern metal* . . . aluminum. The Back Porch Shelf is strong, attractive, rustproof . . . and very *easy* to make. All you need is Reynolds Do-It-Yourself Aluminum from your local hardware or lumber supplier. For *free* copies of Project Sheet No. 18, write to *Reynolds Do-It-Yourself Aluminum, 2478 S. Third St., Louisville 1, Kentucky.*



Materials List
Back Porch Shelf

1 pc. ⅛" x 1" x 1" aluminum angle, 6 feet long
1 pc. ⅜" x ⅜" aluminum bar, 6 feet long
1 pkg. ⅛" dia. x ⅜" aluminum rivets
4 #10 screws or ⅛" toggle bolts

Construction and Installation

1. Cut 2 pieces of 1" x 1" aluminum angle 15" long. Measure back 5" on one end and cut one flange of angle at 45°. Saw out remainder of the flange and bend the opposite flange downward at 45°. Cut other end of angle at 45°. Drill ⅛" hole in notched end bent and drill ⅛" hole in other end as shown.
2. Cut shelf bars from the ⅜" x ⅜" aluminum bar. Center punch hole locations and drill ⅛" holes.
3. Cut 40" length of 1" x 1" angle. Notch out ends and bend remaining flanges 90°.
4. Cut "vees".
5. Bend to form top frame of shelf. Center punch hole locations and drill ⅛" holes.
6. Attach shelf bars to the underside of the top flange, using the ⅛" x ⅜" aluminum rivets or #10 bolts.
7. Complete assembly and mount.

School Shop

THE MAGAZINE FOR TEACHERS OF INDUSTRIAL EDUCATION

Vol. XVI, No. 9 May 1957

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Who's Narrow?

"The education received in the field of industrial arts is exceedingly narrow." So saith the wise man who has had the privilege of pursuing a literary course in a college of literature, science, and the arts. Rarely does it occur to this bright soul that the route that he has followed may be even narrower than the path that passes through the industrial-arts department.

The whole of education may be broad or it may be considered narrow, but the extent of its breadth depends on the attitude of the person who is talking about it.

There are those in the field of education who look on the work in industrial arts as being narrow because it does not include philosophy, English literature, foreign language, or the appreciation of fine pictures or music.

On the other hand, an individual who has attained the exalted position of professor of philosophy and who may be considered a national authority in his field is likely to be looked on as having a broad education, although his knowledge of matters outside of his field is quite limited.

As a matter of fact, many of our leaders in the area of what people are pleased to call "cultural education" are exceedingly narrow. They may be completely ignorant of the mysteries of modern industry, they may know nothing of art, and their knowledge of how the minds of children work may approach the zero mark. Not only are they lacking in knowledge of these fields, but they have no interest in them. And yet some people assume that they have had a broad education. It all depends on who defines "broad."

But what about the people who receive instruction in the field of industrial arts? Those who describe this instruction as being narrow do not appear to comprehend the vastness of modern industry. It is vast in its size, vast in its influence on the social and economic lives of people, and vast in the extent to which it touches on the subjects popularly accepted as being part of a broad education.

These people fail to realize that while one may receive a broad education in a field of study, the field may not be broad in itself when considered from the standpoint of education as a whole. Thus, philosophy, mathematics, industrial arts, etc., are all parts of the total picture of education. Because industrial arts includes much of the content of the other fields, it is broad in itself and it adds considerably to the breadth of a complete educational program.—*T.D.*

Womanpower

The little lady, God bless her, really works and not just at home! Two-fifths of all women over 14 work during the course of a year and the future outlook for the next decade is that half of the ten million who will join the labor force will be women. So says the National Manpower Council.

The understatement of the month is the Council's observation that developments in the high-school education of girls during this century seem relatively modest arrayed against the more spectacular changes in the paid employment of women. Office work, teaching, and nursing once claimed most of the trained women entering the labor force, but now only 29 percent are so employed. Yet, the secondary-school curriculum is still geared to that earlier and now outmoded situation.

Advances in science and technology have opened up wide new industrial occupations for women of an operative, semiskilled, or skilled nature that the schools have taken little trouble to recognize, appraise, and train for. Yet in some industries more than half the factory employees are women.

Skill acquisition is not only important for high-school girls but also for older women who are returning to the labor force after the responsibilities of motherhood are not so pressing. Two-fifths of all employed women are now over 45. Trade and industrial education for women is a need vocational educators have been side-stepping.—*L.W.P.*

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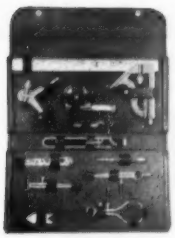

No. 902A has 9" combination square; No. 902B a 12" square. Both have 1" micrometer, center gage, center punch, 6" rule, 4" inside and outside calipers, dividers and hermaphrodite calipers. Other sets available.

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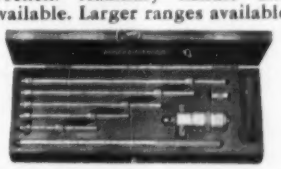

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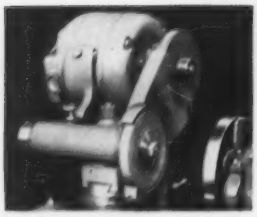
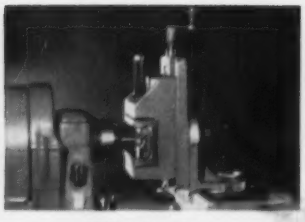
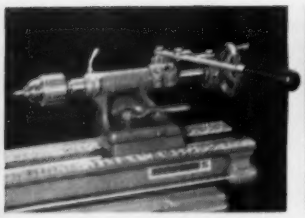


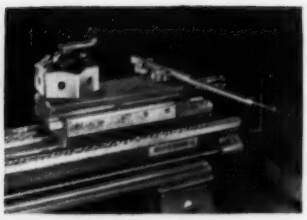
External Grinder



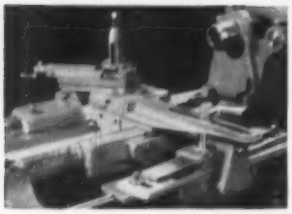
Milling Attachment



Handlever Tailstock



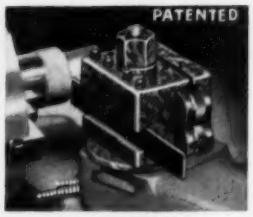
Handlever Bed Turret



Telescopic Taper Attachment

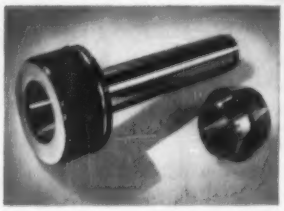
Handwheel Collet Attachment

Handlever Collet Attachment

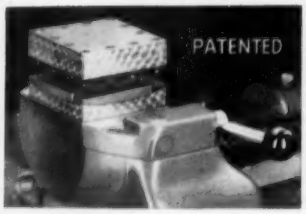


10 in 1 Tool Holder

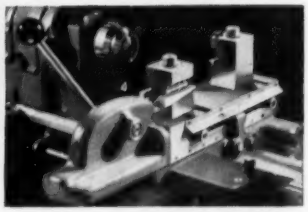
Ball Bearing Live Center



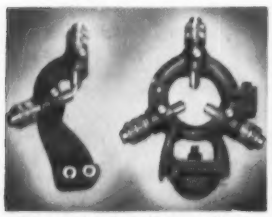
Adjustable Collet Bushing Chuck



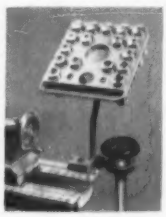
Square Turret Tool Block



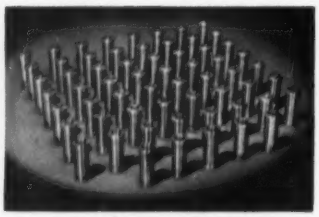
Handlever Double Tool Cross Slide



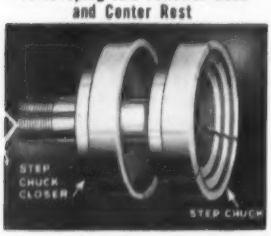
Telescoping Jaw Follower Rest and Center Rest



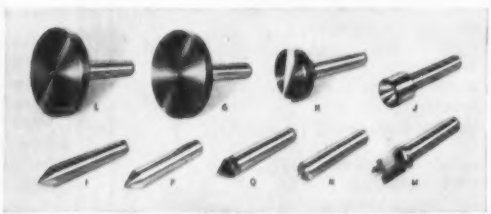
Collet Rack



Steel and Brass Collets

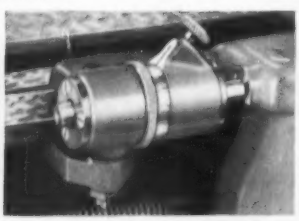


Step Chucks and Closers

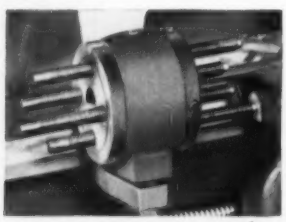


Centers and Drill Pads

Thread Indicator



Micrometer Carriage Stop



Four Position Carriage Stop

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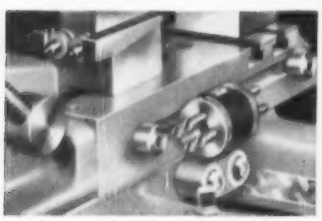
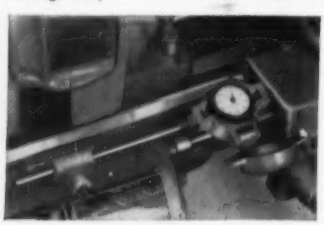
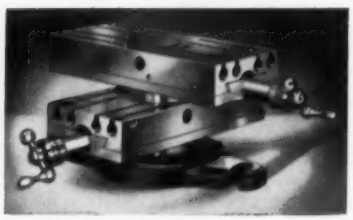


Four Position Cross Slide Stop



Dial Indicator Carriage Stop

Coolant Pump



Universal Table

4-STUDENT BENCHES. Model 1048 has 72 x 48 x 1½ in. top and 72 x 22 x 6 in. testing panel. Model 1049, illustrated above, has 72 x 48 x 1½ in. top and 72 x 7¾ x 6 in. electrical panel with cutouts for 8 standard boxes and receptacles. Both have sixteen 14 x 20 x 5 in. drawers.

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HALLOWELL SHOP EQUIPMENT DIVISION SPS JENKINTOWN PENNSYLVANIA

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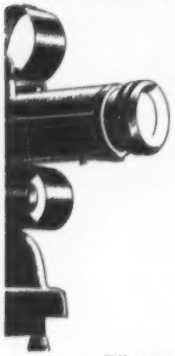
UNIT BASE BENCHES are regularly supplied with 2-drawer pedestal base units. Each drawer is 14 x 20 x 5 in., has flush pulls, and operates smoothly on nylon rollers. Electrical test panel shown.

OPEN BASE BENCHES have all-steel base consisting of two industry-proved bench leg assemblies with two integrally welded cross braces. These are joined by a ribbed stringer. Electrical panel shown.

STANLEY SHOP TALK



New! Film strips on Chisels for woodworking

Another new visual aid series from Stanley Tools. This set helps teach the proper use of wood chisels.
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FRAMES	FRAMES
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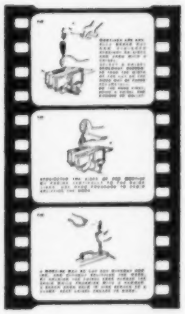
10 How A Chisel Cuts Half Lap Joints	14 Special Chisels and Gouges
	11 How To Grind And Whet Gouges



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An industrialist suggests methods for

Improving Public Relations

By Robert A. Huston

Vice-President for Public and Industrial Relations, Fuller Manufacturing Co., Kalamazoo, Michigan, and Chairman, Advisory Committee, Department of Industrial Technology, Western Michigan College

WHAT can we do to gain better public acceptance of our programs? First of all public relations, like charity, begins at home. In industry, the responsibility for it is squarely in the lap of top management. The policies and implementation of policies with respect to this subject hinge on what management seeks to achieve and, quite generally, reflect the deep-seated philosophy or convictions of those at the helm of the organization.

One of the cardinal principles of effective public-relations programming is that those undertaking the project believe in it themselves. Therefore, in trying to promote better public acceptance of industrial education, we must look first to the attitude of the school administration. If the school board and the superintendent look down their noses at our programs, viewing them as necessary evils, then the first job is one of educating the educators. This is not easy.

I realize that most school administrators are far-sighted and recognize the importance of industrial education. But you and I know there are some who are unable to realize the sociological and economic needs fulfilled by our curriculums. Propriety dictates the extent to which the teacher can go and the devices he may employ to sell the school administration on his program. There is also a matter of economics involved in that teachers, like most other people, like continuity of employment.

Assuming that we, as teachers, have a worthwhile philosophy about our programs, our initial move is to sell the school administration on that philosophy. Realizing actions speak louder than words, we must be in a position to demonstrate the value of our program. This may be done by direct or subtle means. Naturally, the most direct means is to have a program for which no apologies are required and to be forthright in making the administrator aware of that fact. It may be necessary to do some research on the subject—prepare analytical reports fortified with facts and figures—and do a bit of downright selling. Efforts along this line will be aided materially by articles in the journals most frequently read by school administrators and prepared by qualified writers on the subject.

If your school is located in an industrial community, there is an avenue of assistance you can tap in the form of key personnel from various companies. If approached properly, most companies are willing to appoint representatives to advise teachers on the adequacy of the course content in those subjects which have a direct application to their business. Even though you are convinced of the value of your program and may know that it contains what industry requires, it would be well to apply a little "kitchen psychology" and seek counsel, because of the tendency on the part of people in general to champion the causes they have endeavored to help or construct. Thus, if your local industry knows what you are teaching and believes it to be valuable, representatives of industry are in a position to impress the importance of your curriculums on the school administration.

Let us turn now to specific suggestions as to how to improve our public relations. There are four groups with which we must be primarily concerned: students, parents, industry, and the public.

The student is the most immediate means of communication between the classroom and the home. He is a unique public-relations audience. He is unique in the sense that he is the direct recipient of what we teach and his reaction depends considerably on the techniques we use and the understanding we exhibit in the teaching process. The industrial-education program can fall flat on its face right at this point. To avoid this, the program should afford a challenge to students and an opportunity for the bright and dull alike to experience a sense of achievement and satisfaction.

Industrial education can be made more meaningful to students if they have an opportunity to see the practical application in industrial settings of the skills or techniques they are learning.

Displays like this of the Industrial Arts Department of North Carolina State College at the State Fair with students actually performing operations help interpret industrial education to the public.

Students can be excellent purveyors of information about industrial-education programs if they know what is going on. Wall displays like this one at Reavis High School, Oak Lawn, Ill., tell a story.

Plant visitations and classroom demonstrations and talks by industrial representatives can aid in this respect, particularly where the industrial people point out the kinds of employment available in the community and counsel with individual students or classes as to the best preparation for such occupations. Whatever is done in this area should be predicated on the concept that there is dignity in working with one's hands.

As to parents, first we must seek to disabuse their minds of the concept that a college education is an inalienable or universally desirable right. College is a waste of time, facilities, and money for those who are not mentally equipped to absorb what it has to offer and it is unfair to society if the colleges lower their standards to accommodate such students.

You are probably thinking the same thing I am: Just try to tell mother and dad that Junior is not the kind of boy who should go to college. Of course, that is not the way to approach it. The best way to change the parents' thinking on this score is not to try to negate their opinion but rather to substitute alternatives that are attractive enough and logical enough to appeal to them. Thus, the stigma that in some quarters is attached to industrial education may be removed by building it up to the point where it is undeniably reputable and by making everyone aware of that fact.

How is this to be done? They say the world beats a path to the door of the man who makes the best mouse trap. That is not exactly true. People must *know* he makes the best mouse trap first. So it is with industrial education. If and when you have a curriculum that will stand close scrutiny, then you must tell the world about it. It will profit you very little to complain about the inadequacies or lack of acceptance of your programs. Do something about it where it counts. Do everything *you* can to improve your programs and sell them. By the same token, it won't gain you very much to brag about your programs to other people in industrial education. They are already sold on the subject. Bragging should be done discreetly, but done, nonetheless, where it will do some good.

Have you featured industrial education at your school assemblies? Demonstrating projects and techniques used to make them? Does your school have one P.T.A. meeting a year devoted to vocational-industrial education and industrial arts? Do you exhibit articles produced by your students in the school lobby or halls? Do you exhibit industrial products of your community in the schools? Have you exhibited your students' work in public places such as libraries and downtown banks or stores? If you haven't, it will pay you to make this effort.

With a little imagination you can interest your local newspaper in the unusual or particularly outstanding achievements of your class or of an individual student. To have newspaper appeal, there must be something novel, unique, or outstanding about the event or achievement. Newspapers and radio and television stations are eager for newsworthy material and at times can be interested in a purely educational feature. When such opportunities present themselves, use them for all they are worth. Sell your philosophy as well as your product.

Are you or your professional associations preparing articles for trade papers, educational journals, or popular magazines pointing out the nation's need for a greater degree of skill on the part of its manpower and the role industrial education can play in supplying it? Better still, are you trying to interest business men and industrialists in writing articles which recognize industrial education as one of the answers to the needs of industry tomorrow?

I have mentioned earlier the value of advisory committees. They are double-edged devices. In addition to providing counsel or reaffirming your ideas, the members of such committees are in a position to carry the torch for your cause, if you give them half a chance. Most people want to champion something.

The foregoing are but a few random suggestions of things that can be done to improve the public relations of industrial-education programs. You will find a wealth of good, usable data in the April, 1956, issue of SCHOOL SHOP, and many specific techniques are outlined in the American Vocational Association's booklet entitled, *Your Public Relations.*

In conclusion, let me say this: By far the most important public-relations devices that can be used are a sound industrial-education program and *you.* First, it is your responsibility to make your programs superior by any standards. Then it is your responsibility to stand erect, with no apologies, as the professional educator you are. You have more in common with a larger segment of the community than your associates who teach in the general academic areas. Therefore, you should take a very active part in both community and school life. Don't miss an opportunity to discuss your field and your programs privately and publicly. The more people respect you, the more they will respect your programs. Make the industrial-education public-relations program *your* public-relations program. ★

These dust pans are made to commercial specifications with students making operation plans.

From raw material to finished product

Operation Dust Pan

By James O. Reynolds

McKinley Occupational School, Dayton, Ohio

Patterns are used for laying out and templates and fixtures help in the production processes.

AN added feature to the total program of shopwork at our school is a production job in each shop involving the making of an article from stock material to finished product. Such a procedure has merit because of the shop organization involved as well as giving experience in industrial procedures.

Each year we accept an order for 50 heavy-duty dust pans from the school maintenance department. They are standard commercial size and type so no design problem is involved. Moreover, the same patterns are used each year, but the methods of fabrication vary as this is the creative portion of the job. The job can be easily finished in one semester under the system we use.

When the order and materials arrive, the production plan is set up. Four boys—usually volunteers—assume complete responsibility for the project. No titles or leadership designations are conferred at this time. It is interesting to observe the natural ascendancy of one or two of them in this respect.

They are then given the plan of operation, the bill of materials, the blueprints of the project, and the various patterns and fixtures involved. With this material before them, they determine their individual duties and familiarize themselves with the job. Supervision by the instructor is necessary at this point to assure a good working arrangement and to answer their questions about production.

When the group understands that the finished product must meet commercial standards and a plan of organization has been worked out, the "go-ahead" signal is given. Following is a typical plan of operation:

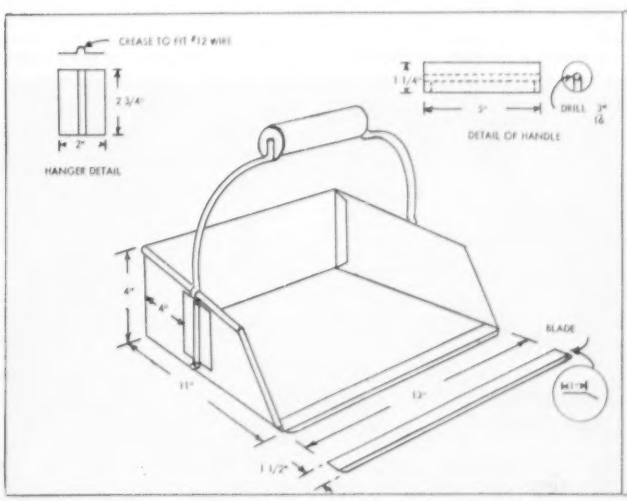
Operation:	*Tool or Machine*	*Inspection*
Layout	Patterns	All
Cut to dimension	Squaring shear	All
Hem edges	Bar folder	Spot
Bend to shape	Cornice brake	Spot
Weld tabs	Spot welder	Spot
Wire cut to length	Wire cutter	All
Edges wired	Wiring rolls	Spot
Cut blade to size	Squaring shear	All
Weld blade to body	Spot welder	Spot
Turn handles	Wood lathe	All
Cut and form bail	Wire cutters	Spot
Cut and form bail hangers	Squaring shear	Spot
Weld bail hangers	Spot welder	Spot
Finish	Spray or brush	Final

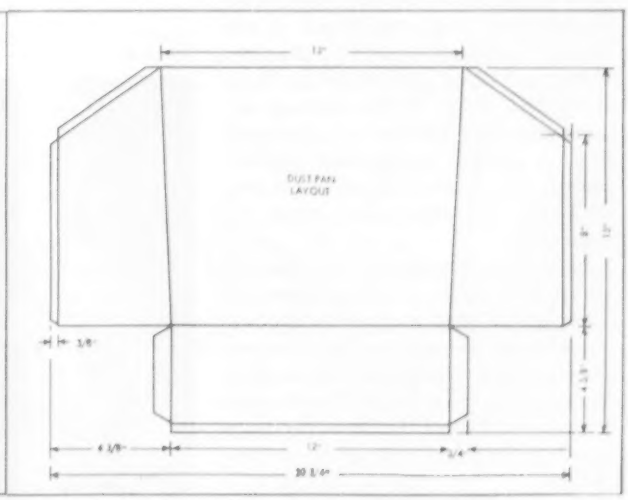
The following bill of materials may be changed to conform to other designs or needs. For example, galvanized steel may be used in place of black sheet steel, and riveting, which is structurally as sound, used instead of welding.

Bill of Materials

Body	15″ x 21″ black sheet steel, 20 gage
Hangers (2)	2″ x 2¾″ black sheet steel, 28 gage
Blade	1½″ x 13″ black sheet steel, 16 gage
Body wire	36″ #12 wire
Handle wire	28″ #8 wire
Handle	1¼″ x 5″ hardwood

The finished dust pans are of commercial quality and are used by the school maintenance men. The students can see the reason for the emphasis on inspection and quality because of the hard service required of the pans and they have had an opportunity to plan an industrial operation. Moreover, they have had experience in production work in the metalworking area of the shop. ★





Each class in the mass-production activity plans and organizes its own production setup, with supervision by the students themselves. Here a planning session is led by the project manager.

Students learn industrial methods with this

Ninth-Grade Mass-Production Activity

By C. H. Hilliard

Stemmers Run Junior-High School, Baltimore County, Maryland

A MASS-production activity, recently introduced at Stemmers Run Junior-High School, has proven to be a worthwhile method in helping students prepare themselves for life in our modern industrialized democratic society.

The activity was instigated in an attempt to accomplish the following objectives: develop in students the ability to work together, develop a cooperative attitude, develop a sense of responsibility, aid in the development of leaders and followers, develop concepts in regard to methods employed in mass production, show the importance of collective effort in modern industry, and develop concepts in regard to the importance of all occupational endeavors.

Participating classes in the activity are selected from the ninth-grade industrial-arts general woodworking classes according to previous performance in industrial-arts work. Each class is organized similar to a small commercial woodworking shop. Supervision is carried out by students elected by the class. These supervisory students are in charge of various phases of the organization, simulating the organization in industry, such as project management, quality control, tool control, design and layout, production operations, and public relations.

Each class, through its elected supervisory personnel, plans and organizes a production setup designed to produce a number of identical articles. The production quota depends on the number of students in class, for one item is made for each member of the class. The items are distributed to the students on completion.

All ninth-grade classes in the Stemmers Run school, with the exception of the first nine weeks of the year, come to the woodshop directly from mechanical drawing. Therefore it is possible for most classes involved in the mass-production activity to enter the woodshop with working drawings of the product they plan to produce. The mechanical drawing teacher gives the group instruction on the importance of design, planning, and working drawings in the industrial production of any product.

The first period in the shop is spent in explanation by the instructor of the organizational setup, general procedure, and purpose of the mass-production activity. The next step is to elect those students who are to carry out the supervisory duties. Desirable qualifications of candidates for the positions are discussed by the class. The instructor turns the class over to the project manager, when elected, who then leads the class during the election of the other supervisory personnel.

Student control of these elections is a very important phase of the activity. To date there have been very few cases in which the most capable boys in the class have not been elected to supervisory positions. The result has been good student supervision, with relationships between supervisors and workers on a very high plane. We believe this would not have been the result if supervisory positions had been filled with instructor appointees.

The next step often requires several periods. This involves the planning of the production operations procedure. The whole class participates in this planning. The production plan is recorded by the timekeeper, as it is developed, and it is posted for reference.

Carrying out the production plan is the next phase of the activity. An instructor-supervisor conference is held at the beginning of the working period if it is considered necessary.

Tools for the activity are issued from the crib in accordance with a method used by a local industry. The tools to be checked out are listed on a requisition form which is signed by the worker. When the tools are returned, the form is returned to him as a receipt. This affords a definite method of tool control.

Both the tool requisition forms and the forms used by the timekeeper are printed and made into pads by graphic-arts students.

Some groups have incorporated the mass production of pottery articles as another phase of the activity. The pottery pieces are produced by slip casting, a method used in pottery production

The student supervisory personnel in the mass-production activity hold a conference on the project.

Mass production in action. Shown here are the timekeeper, students preparing parts for the product, and a student prefinishing the product.

Some groups incorporate mass production of pottery articles as another phase of the activity. Here pottery is being made by slip casting method.

by industry. This phase of the activity is carried out when the pottery piece can be used in conjunction with the wood product involved. An example of this is a small wall shelf with which a vase or a flower pot may be used. Enough pottery pieces are made so that each student in the class also has one to use with his wood product.

Before the activity terminates, an instructor-supervisor conference is held so that the instructor may hear the opinion of this group in regard to the performance of individual student workers. Individual student evaluation is based on the individual's rating with regard to leadership, the ability to follow, cooperation, initiative, and the ability to accept and carry out a responsibility.

The production operation is also followed by a class discussion, during which the class evaluates the activity and the resulting products. At this time they also discuss what they have learned and consider the importance of what they have learned as members of our industrial society.

In general, the responsibilities of the students filling the various supervisory positions are as follows:

Project manager: He is the student in charge of the entire project. He is directly responsible to the instructor for problems involving the administration of the activity.

Operations foreman: He carries out the plan of production. This involves the transfer of labor from job to job, the elimination of bottlenecks in production, and the assignment of jobs in accordance with the abilities of the individual concerned.

Quality control supervisor: He sees to the inspection of parts, sub-assemblies, and assemblies. He confers with the instructor, project manager, and operations foreman in the rejection of parts for rework or scrap.

Supply and tool control supervisor: He is responsible for the availability of material when and where needed. He is supervisor of the tool crib and keeps a running account of material which is scrapped.

Timekeeper: He maintains a time sheet by which a day-by-day record is kept of the individual's time on the job. Each period is considered one working hour. He also keeps a day-by-day account of man hours involved in accomplishing various phases of the work. This record is kept on the special form provided for the purpose.

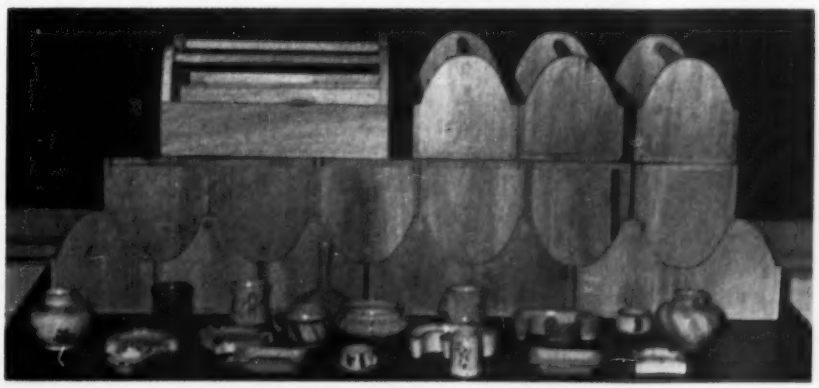
Design and layout supervisor: He is in charge of the development of jigs and fixtures if needed. He supplies patterns and detailed drawings when needed and sees that a pictorial and working drawing is posted for class reference. He develops decorative designs for pottery when it is produced as part of the activity.

Public relations supervisor: He attends to the explanation of the activity to visitors. He submits a report of the production progress every three weeks and photographs stages of the activity, making prints in the shop darkroom. He is responsible for the production-activity bulletin board, posting such items as photographs, drawings, names of supervisory personnel, etc. He also submits a brief written report describing the activity to the editor of the school paper for publication.

Correlated Activity

Recently a ninth-grade teacher of mathematics at the school developed an activity correlated with this industrial-arts mass-production activity. In the math class the students work out the complete cost of production. This involves calculation of board feet of lumber used and the cost of the lumber. Labor is calculated by assigning an hourly wage for each student and figuring the total pay for work on the products. The time involved is taken from the timekeeper's record. The result of these calculations is a statement of the entire cost of the collective effort and the cost of the individual item produced. One of the most important concepts which results from this correlated math lesson is the comparison of material and labor costs.

A display of completed projects made in the mass-production activity, both clay and wood products.

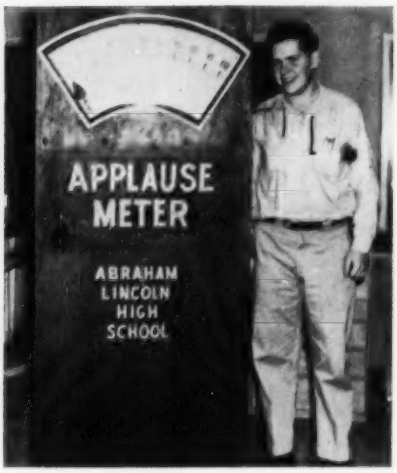


Here's a worthwhile project for the more advanced pupils

Electronic Applause Meter

By Joseph Murri

Abraham Lincoln High School, Philadelphia, Pennsylvania



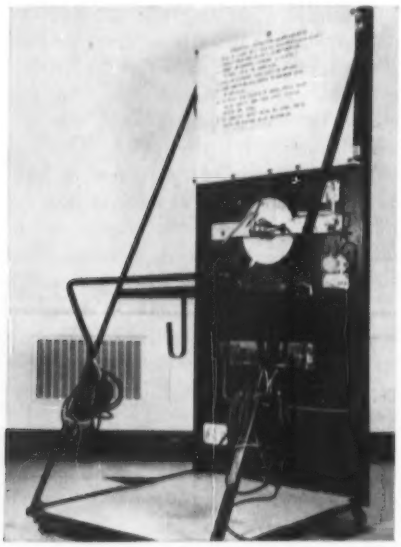
Front view of the applause meter, which won an ingenuity prize in the 1956 Ford Industrial Arts Awards, with its maker, G. Robert White.

THE electronic applause meter shown here was built by one of my students, G. Robert White, and won for him a prize in the 1956 Ford Industrial Arts Awards. This meter is for use in auditoriums or other places where an audience is to decide the winner of a contest by the intensity of applause given to the contestants. On its illuminated large scale with linear divisions of 0 to 100, the pointer can be made to stop at the maximum applause reading. It can be reset to zero by a hand switch on a long remote-control cord, or reset manually at the applause meter.

Basically, the electronic applause meter consists of a microphone which is energized by the applause of an audience. The electrical impulse from the microphone is fed to an amplifier. The output of the amplifier is rectified by a full-wave bridge rectifier, and the rectifier supplies direct current to a solenoid, which pulls a movable soft-iron core that is part of the pointer movement mechanism.

The intensity of the applause determines the power output of the audio amplifier and thereby the amount of electrical energy supplied to the meter solenoid. The greater the d-c power supplied to the solenoid, the greater will be its magnetic field which, in turn, will cause a greater movement of the movable soft-iron core.

Rear view of the electronic applause meter.



In order to have the pointer stop at maximum reading, the pointer is attached to a painted iron disk, 10″ in diameter and 1/16″ thick. A sharp chisel edge on the end of the reset lever (see diagrams) lightly rests on the rim of the disk. The disk and the pointer both move as current is applied to the solenoid. When the current in the solenoid ceases, the disk will be held at this point by the sharp edge of the reset lever. The disk and pointer are returned to zero by a spiral spring if the reset lever is raised away from the rim of the disk, manually or by the remote relay.

The remote zero reset control consists of a relay attached to the reset lever. De-energizing the relay coil causes a spring to place the reset lever on the rim of the disk, thereby preventing the disk from being pulled back to zero by the force of the restoring spring. When the relay is energized by the reset hand switch, the relay lifts the reset lever away from the rim of the disk and causes the pointer to return to zero.

The frame is constructed of welded steel angle. The handle is made from 1″ conduit welded to the rear brace angles. The front and bottom panels are made of ½″ plywood. The scale is painted on a sheet steel plate. The pointer is made of aluminum, with a weight on a 12″ tail for balancing.

The meter movement mechanism consists of a mild steel disk, 10″ in diameter, 1/16″ thick. To this is attached the pointer, a spiral return steel spring, and a semicircular soft-iron core. The disk assembly is supported by a ¼″ diameter steel shaft which moves on ball bearings. Brass balancing weights are attached to the disk. The restoring-force spring is a spiral spring taken from an old alarm clock. The return spring is attached to a brass lever ½″ wide, ⅛″ thick, and 8″ long. This is used for adjusting the return spring tension when calibrating the meter.

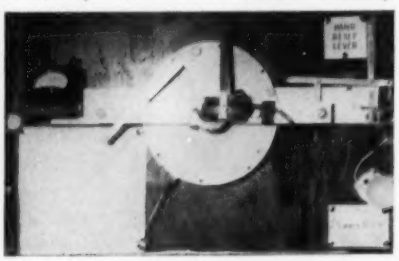
The zero rest position is fixed by a bolt which also supports the scale. The semicircular soft-iron core moves freely into the solenoid and the solenoid is held by brass supports.

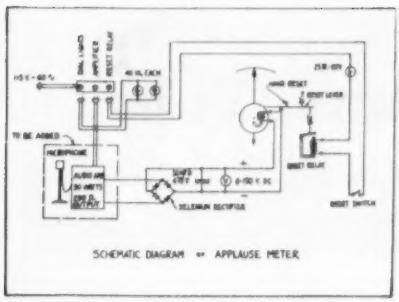
The electrical circuit (see diagram) is the result of experimentation. The selenium rectifiers are of the 400-ma type. A d-c voltmeter is used as a reference for calibrating the applause meter. A 25-w, 115-v lamp is connected in series with the relay coil for better relay operation.

The meter solenoid is a coil from a 10-w old-type dynamic cone speaker. It has a d-c resistance of 600 ohms. The coil has an outside diameter of 3¼″, an inside diameter of 1¼″, and is 1½″ high. Two turns of .015 thick tin-plated iron is wrapped around the outside of the coil in order to concentrate the magnetic field. A dynamic-type microphone is used. (We used Shure, Model 55S.)

The electronic applause meter is calibrated by adjusting the tension on the return spring attached to the pointer movement disk. The volume control on the amplifier is adjusted so that an audio

A close-up of the meter movement assembly.





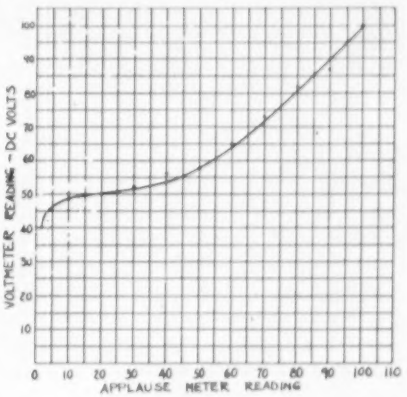
signal supplied to the microphone will produce a reading of 100 on the applause meter when 100-v d-c is supplied from the rectifier to the solenoid. Shown on this page is a graph on the applause meter reading versus the d-c voltage applied to the solenoid. This was found to be helpful for recalibrating the electronic applause meter.

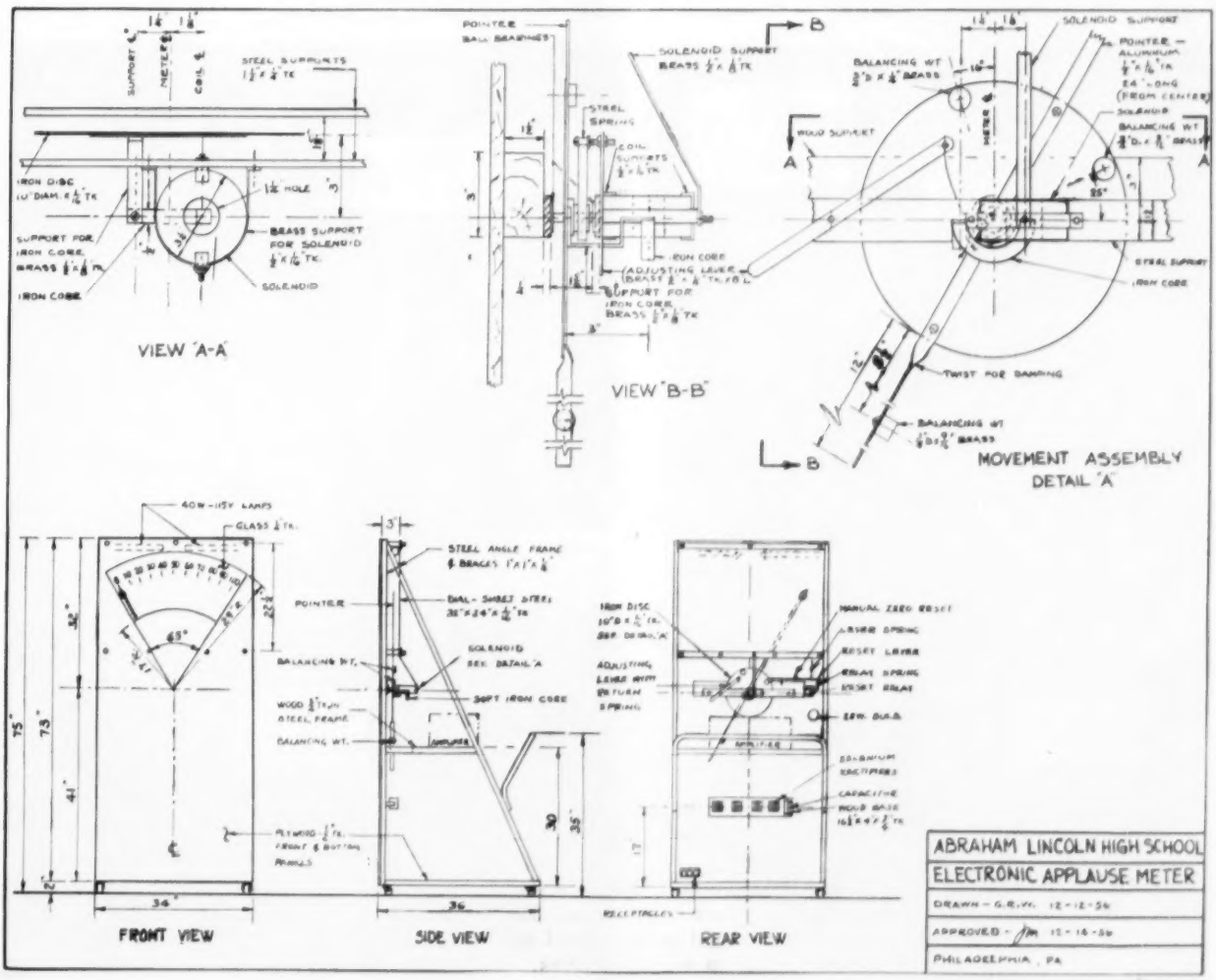
When the electronic applause meter is first used before an audience, it will be necessary to obtain the maximum applause from the audience in order to adjust the volume control on the amplifier. At maximum applause the volume control is turned up so that the d-c voltmeter reads 100 volts. At this point the applause meter should also indicate 100. Once the volume control setting is obtained, it should not be moved during the entire performance for accurate reading.

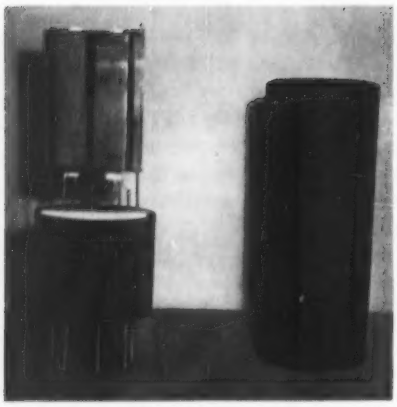
From an educational viewpoint, this project, in addition to involving a wide range of operations in woodwork, metalwork, and electronics, will tend to develop in the students a feeling that they are making a contribution to the school rather than merely doing something for themselves.

From an individual viewpoint, in our case, the project assisted the student in acquiring the habit of accepting responsibility and dependability, shown by his willingness to undertake the contruction of a difficult project. It also assisted him in developing his interest and creative ability; in acquiring the habit of systematic procedures in planning, constructing, and testing a project; and in developing perseverance in completing the project. It also assisted him in acquiring the habit of selfreliance and resourcefulness in meeting obstacles. This was demonstrated by the experimentation which resulted in the use of a rectifier circuit for supplying d-c power to the meter solenoid and in the development of the mechanism for holding the pointer at maximum applause reading. ★

Applause meter reading versus d-c voltage applied to solenoid for recalibrating the meter.







Standing over 21" high, this model vacuum tube can be completely disassembled to show parts.

Teaching is made easier with this

Model Vacuum Tube

By Gerald R. Quilling

Lincoln Park, Michigan, High School

IF the radio student has a good understanding of the elements in a vacuum tube and where they are located in reference to each other, he will progress much faster and understand more clearly their operation. A better job of teaching can be done, also, when all students are following the teacher as he explains the function of a certain tube element and all eyes are on it through the use of a large model.

Making a model is not difficult as other divisions of the school shop can be brought into the production side, such as the wood and metal shops.

The element holder is made of wood, formed on a lathe, and painted a light gray. Holes are drilled in the top to hold the elements upright.

A cardboard tube is used for the outside of the tube base and the bottom is made of wood. Countersunk holes in the bottom into which ¼" nuts are imbedded hold the tube pins that are made of ¼" rod, 3¼" long. The guide pin is made of 1¼" dowel rod with an 8-32 machine screw inserted in it and held in place by wood putty. An 8-32 nut is imbedded in the bottom of the tube base so the guide pin can be removed to illustrate the pin location on miniature tubes.

The plates are made of transformer iron with a piece of ⅛" rod, 10½" long, spot welded into place to hold the plates upright.

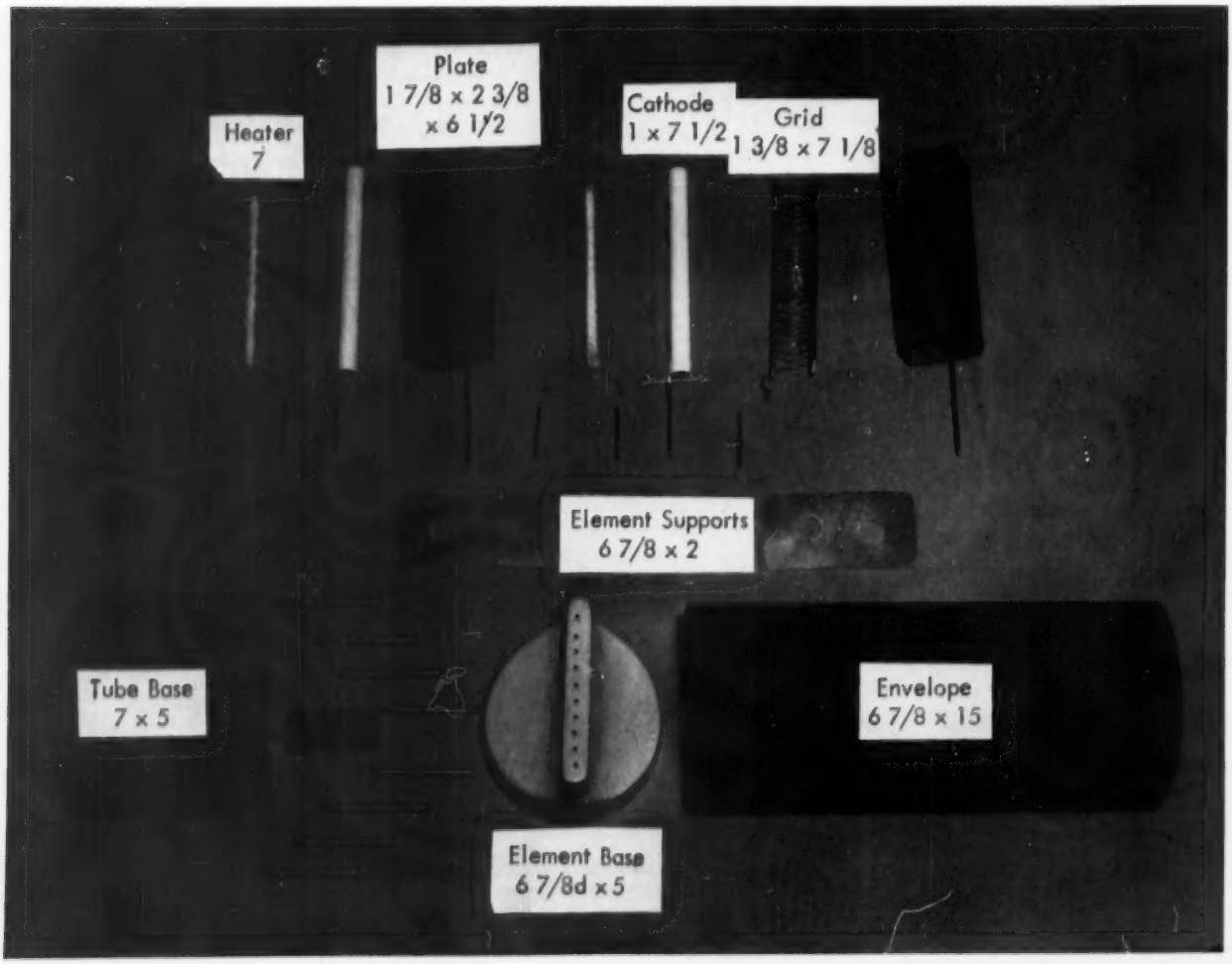
The grid is formed from two pieces of rod with solid wire wound in a spiral shape and soldered in place.

The cathodes are made of ½" conduit, painted white, and the heaters are wires twisted together.

The two element supports are made of ⅛" clear plastic with large holes drilled in them to hold the cathodes and smaller holes for the other connections.

The envelope is made of transformer iron with a piece of wood formed to fit the top. The tube base and envelope are painted black.

The model can be easily disassembled and parts and their functions readily explained. ★



B-G offers a complete GRAPHIC ARTS SHOP

The New CRAFTOOL ART PRINTMAKER

makes beautiful reproductions of etchings, drypoint, linoleum cuts, woodblocks, wood engravings, lithographs, type, line cuts, photo-engravings. For all three printing processes: RELIEF — raised surface; INTAGLIO — recessed surface; LITHOGRAPHY — flat surface. The PRINTMAKER makes one or one hundred prints of unusual quality . . . each line and shading reproduced with clarity and accuracy. It is a complete self-contained unit of heavy cast iron accurately machined to precise tolerances not usually found in equipment of this type, and beautifully finished in gray enamel. It is designed to withstand the constant use required in school graphic arts, industrial arts, and occupational therapy departments.

FEATURES

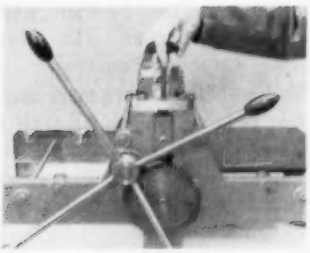
- Machine castings ribbed and reinforced for greater strength.
- Lower roller actuated by a gearing system, eliminating old fashioned oversize handles and permitting an exceptionally smooth, jerk-free movement of the bed.
- Warp-proof, unbreakable, reinforced plastic bed moves on 12 sensitive rollers. Flatbed measures 20"x14"; chase is 14"x11".
- Three cylinders are provided — one steel 3" diameter fixed bottom roller and 2 interchangeable upper rollers, one 3" steel and the other a 5¼" rubber covered roller, providing an offset printing surface 15½" long.
- Specially designed spring provides two types of pressure and permits high quality prints without the use of a felt blanket.
- Type, blocks, etc., can be used directly in the chase instead of in a removable insert.
- PRINTMAKER is furnished as a floor unit with heavy steel cabinet base or as a bench model adaptable to any available stand.
- Detailed instructions furnished with each press.

Cabinet Model No. 5120

Finished in gray enamel with polished steel fittings. Floor Area — 36" x 24". Overall Height — 50". Shipping weight (with cabinet) — 320 lbs.

Price $395

Press Showing Offset Roller in Place



Press Showing Easy Tension Adjustment

Press Showing Etching Roller in Place

GRAPHIC ARTS KITS FOR THE PRINTMAKER

ETCHING KIT

6 Zinc Plates 3" x 4"
6 Zinc Plates 4" x 5"
1 Zinc Plate 6" x 8"
12 Plastic Plates 5" x 7"
2 Burnishers
2 Etching Needles
Etching ground, 8 oz. liquid
1 Ball of Etching Ground
Stopping Out Varnish
Asphaltum, pint
2 Chinese Pencils
2 Sheets 0000 Emery Polishing Paper
Burnt Plate Oil, pint
4 Tubes ink, ½ lb. each
20 Sheets USA Print Paper, rag white 26" x 19"
10 Sheets Japanese Print Paper, UNRYU 24" x 19"
10 Sheets French Print Paper RIVES 26" x 19"
10 Sheets English Print Paper ARNOLD 25" x 19"
Powdered Resin, ½ lb.
1 Sample assortment of 10 different Etching Papers
1 244-page book — "Graphic Arts Crafts"

No. 5019 Etching Kit $39.00

LITHOGRAPHY KIT

6 Zinc Plates 8" x 10" — Grained
1 Zinc Plate 10" x 14" — Ungrained
3 Dozen Litho Crayons
1 Lb. Crayon Ink
1 Lb. Quartz
6 Sticks Rubbing Ink
1 Pint Litho Varnish
1 Doz. Crayon Pencils (asst.)
1 Pint Liquid Tusche
1 Sponge
1 Litho Stone 10" x 14"
1 Ink Brayer
20 Sheets—Rives Paper 19"x26"
1 Lb. Carbo-Rubbing Grain
1 244-page book — "Graphic Arts Crafts"

No. 5021 Lithography Kit $69.00

LINOLEUM BLOCKS

Fused Gray Linoleum Blocks and Printers Ink are listed in the B-G catalog.

RELIEF PRINTING KIT

6 Linoleum Blocks 3" x 4"
4 Linoleum Blocks 4" x 6"
2 Linoleum Blocks 6" x 8"
1 Linoleum Block 8" x 10"
1 Brayer
1 Professional set Linoleum Cutters
4 1-lb. cans ink — Black, Red, White, Yellow
1 Carving Knife
30 Sheets Japanese Print Paper UNRYU 24" x 19"
10 Sheets French Print Paper RIVES 26" x 19"
2 Wood Blocks 4" x 5"
1 Wood Block 6" x 8"
5 Wood Block Chisels
1 244-page book — "Graphic Arts Crafts"

No. 5020 Relief Printing Kit $35.00

Send for the new 1957 B-G Master Catalog

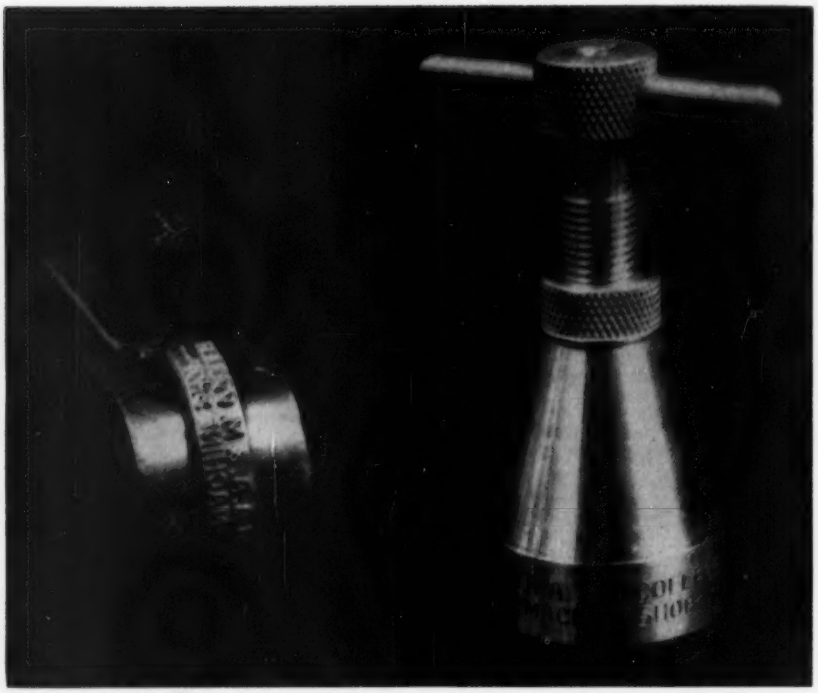
BRODHEAD-GARRETT CO.
4560 East 71 Street • Cleveland 5, Ohio
50 Years Serving School Shops in America

You can promote good public relations if you

Trademark Machine-Shop Projects

By H. J. Gerber

Head, Machine-Shop Department, Oklahoma Institute of Technology, Oklahoma A & M College, Stillwater



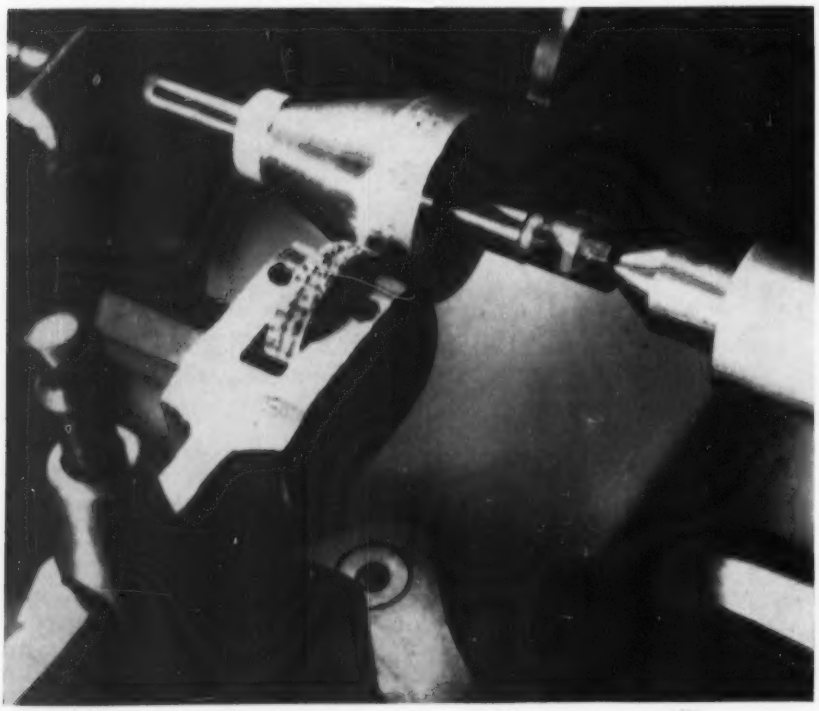
Left above is the embossing roller for applying the trademark or identification. The lettering is purchased commercially but holder is shop made. Screw jack shows lettering embossed on its base.

MOST teachers of shop subjects will agree that there is a considerable public-relations value in acquainting the public with the accomplishments of the students in their classes. One way in which this can be done is to follow some of the methods used by industry in trademarking their products.

In the school machine shop it is not a difficult matter, nor very expensive either, to produce a thoroughly professional trademark on any metal product. The illustrated screw-jack problem is one example of this.

Every beginning student in our classes makes one of these projects while learning the basic engine-lathe processes. The completed project, made from aluminum and brass bar stock, is intended for use primarily as a desk ornament or paper weight. Several hundred of these are produced each year in our machine shop. Over the past few years probably 3,000 of them have gone out of our institution and will be found on the desks of engineers, technicians, and teachers all over the United States and in many foreign countries.

The embossing roller is held in the tool post of the lathe and rolls in contact with work which is held on standard lathe mandrel. The lathe is revolved by hand to apply the lettering to work piece.



The school trademark embossed on the base of this jack is rolled in by use of the engine lathe with very simple tooling. We purchased a tool-steel embossing roller which was engraved to order by a firm specializing in this sort of work. Its cost was approximately $16.00. It is mounted in a simple student-built tool holder designed to be held in the tool post of the lathe. The work is held on a standard lathe mandrel and the lathe is rotated by hand while the roller is in contact. The whole process takes only a few minutes.

We use this same roller to mark many other items ranging from small tools to parts of the many larger machines designed and built in our advanced classes. It has even been used in the shaper to mark flat work.

We also make use of other marking methods to produce a similar identification of professional appearance. Thousands of ash trays produced as a press-work problem are marked with a ring die inserted in the final-stage press-forming die. Many of our machine-tool projects have our "brand" name cast into an important casting of the machine. Occasionally we make use of a pantographically engraved brass name plate which is then screwed onto a product produced by our students. ★

ROCKWELL-BUILT

the all new DELTA dust collector

New Delta Dust Collector shown with Delta Saw-Jointer. It can be attached to *any* other workshop power tool quickly, easily.

. . . for dozens of school shop uses!

The only industrial type dust collector priced to fit even the smallest school shop budget.

POWERFUL, BUILT TO LAST—Picks up small screws, nuts, bolts—even a 1" steel ball—without damaging suction mechanism.

ATTACHES TO ANY TOOL—Mounted on casters, rolls where you want it.

GET ALL THE FACTS—See how this great new Delta Dust Collector picks up sawdust, chips, metal filings, converts for paint spraying and does dozens of other jobs. Visit your Delta Dealer—he's listed under "TOOLS" in the Yellow Pages of your telephone book. Or see it at leading department or hardware stores.

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DELTA... PRIDE OF THE NATION'S SCHOOLS

"The facts" are on tap with this

Automotive Record Card

By George R. Kinsler

La Crosse, Wisconsin, Vocational and Adult Schools

LA CROSSE VOCATIONAL AND ADULT SCHOOLS
Automotive Industries Dept.
Student Achievement Record

Date: From _____ to _____

Name

Classification — Instructor

A—Classroom lecture and demonstration on the subject B—Attempted to put the lecture and demonstration to use C—Can perform well enough to be employed

Unit XII GENERATOR SYSTEM	FORD						G.M.						CHRYSLER					
Manipulative Elements	V-8			6			V-8			6			V-8			6		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
1. Inspect transmission																		
2. Adjust control linkage																		
3. Repair control linkage																		
4. Replace transmission																		
5. Repair transmission																		
6. Analyze transmission troubles																		
7. Inspect overdrive unit																		
8. Replace overdrive unit																		
9. Adjust overdrive cut-in speed																		
10. Check kickdown switch circuit operation																		
11. Check oil level in transmission																		
12. Drain and refill transmission																		
13. Check electric circuit on automatic transmission																		
14. Replace oil seals																		
15. Repair overdrive unit																		
16. Replace torque converter																		
17. Disassemble transmission																		
18. Assemble transmission																		
Unit XIII STARTER SYSTEM																		
1. Inspect starter unit																		
2. Check starter operation																		
3. Lubricate starter																		
4. Analyze starter troubles																		
5. Replace starter unit																		
6. Replace Armature																		
7. Turn commutator on lathe																		
8. Replace starter brushes																		
9. Clean commutator																		
10. Replace starter drive																		
11. Replace solenoid																		
12. Replace starter switch																		
13. Replace starter cable																		
14. Replace starter bearings																		

Sample of student achievement record. Cards are printed on both sides. Units are as follows: cooling system, engine lubrication, fuel and exhaust systems, chassis lubrication, chassis electrical system, differential and rear axle, brakes, tool maintenance, engine ignition, clutch, engine service, generator, starter, transmission, springs and shock absorbers, universal joint and drive shaft, body and frame, wheels and tires, accessories, and steering control assembly.

FACTS, just the facts," asks Sgt. Joe Friday in a monotone on a TV program. Likewise, prospective employers want facts when hiring automotive students.

The record system we use gives employers and other interested people, including students themselves, the facts about what each student has done in the automotive shop. Our progress record system has worked out very successfully in both vocational and industrial-arts courses.

The hub of our record system is a series of 5" x 8" cards, one of which is reproduced here. The cards are used to check work on the actual production line in vocational classes while mock-ups and models are used for some of the work in industrial-arts classes.

The cards are based on a job analysis of the automotive field and can be changed, of course, if new operations need to be added or old ones deleted.

The cards can be colored on the edges or each card can be of a different color to help in identification of the specific cards for filing purposes. The colors also facilitate the recording of a student's accomplishments.

Ford, Chrysler, and General Motors cars were selected to list on the card because they are most representative of the cars found in the automotive repair field.

An example of how these cards can be used in a production shop is as follows:

The job is assigned on a regular work order. The make of car, a detailed report of work to be done, and the student or students who are to complete the work are recorded on this order. A work order may have six or eight operations on it and several names of students.

The instructor records from the work order on each student's set of records the operation completed and how proficient he believes each student to be. For repetitive operations, a small mark may be made at the top of the column near "V-8" or "6."

A prospective employer need only look at a student's production record and see the type and quantity of work his prospective employe has completed. The records should also be given to the students periodically so they can see how they are progressing.

Probably some readers are throwing up their hands and saying, "How could I do all this record keeping? I'd need a secretary!"

Actually I have found that I need approximately one hour a week to maintain properly the records of a vocational class of 24 students who spend 20 hours of production time a week in the shop. This fluctuates, of course, from week to week, depending on the amount and type of work being done.

Other readers may be saying, "Eighteen or 20 units in a job analysis make much too long a list of items to check. I still need that secretary!"

Again the number of items in a group can be adapted to the needs of a particular shop. A vocational program requires a more extensive curriculum than an industrial-arts set-up which does not carry the students as far in the automotive field. The system can be tailor-made for the purpose of the course.

The cards are useful in making assignments from day to day. The instructional needs of the student determine the kinds of work he is given and the completeness of his coverage of the field is easily determined.

When a prospective employer looks over this record, he has an excellent idea of what the student can do. With this record, plus such tests as intelligence and aptitude and other school records, an employer can really get "the facts" about a student. ★

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And to help you get your body shop section program going, a thoroughly qualified Blackhawk man will:

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Dept. P-3757, Milwaukee 46, Wis.

WORLD'S LARGEST MANUFACTURER OF HYDRAULIC POWER TOOLS

For high pupil interest and low project cost

Teach Silk Screening as a Group Project

By Paul A. Axelsen

Instructor of Printing
Stout State College, Menomonie, Wis.

There is never a lack of interest in a group silk-screen project.

MANY industrial-arts instructors have never explored the possibilities of the silk-screen process because of such supposed obstacles as time expended per project, cost per project, and number of units of equipment needed. A group project method of teaching it, however, removes these obstacles and assures the practicality of the process for all schools, regardless of size.

The instructor of printing or graphic arts often has difficulty in creating suitable take-home projects of real pupil interest and value. The versatility of the silk-screen process makes it a "natural" for developing projects of which any student can be proud, yet maintaining maximum efficiency in regard to cost factors and use of equipment.

T-shirts, sweatshirts, jackets, headscarfs, ties, towels, as well as articles made of wood, leather, and paper all print easily and beautifully with the silk-screen process. It is even possible to use the same stencil and frame to print on all the varied objects just mentioned. The wide choice of design and project materials has appeal to every participant.

The group project method overcomes the "time expended per project" argument in the following manner:

1. Each lecture on the process is given to the class as a complete group.

2. The complete demonstration is presented to the class in such a way that everyone can see and understand it well.

3. At the completion of the lectures and demonstrations, the instructor suggests that varied materials may be printed with the school emblem, state animal, or whatever design seems fitting for the area. Depending on the time available and individual student interest, some students can easily stencil the class design on as many as a half dozen articles.

The group project method does away with "high cost per project" because silk-screen frames are easily made in the school wood shop, each student can easily furnish the project materials to be stenciled, and the few commercial supplies needed are not expensive.

The group project method also overcomes the supposed problem of "large number of equipment units." It is true that the number of units can be an expensive item if the instructor attempts to provide a full set of equipment and space for every member of a complete class. Generally speaking, when the group project method of teaching is used, one frame for each class is sufficient.

The group project method actually encourages democracy in action. After the students submit their designs, the class will soon decide through the democratic process which one design the group will want to use. When the design has been prepared for cutting, the instructor should select one or two students to cut out the stencil. Part of the class should be permitted to watch the cutting procedure during a portion of a period while the remainder of the class carries on with regular class work. These groups can be alternated each period or day, according to the instructor's desire. If the instructor wishes, he can assign a different student to the cutting procedure each half period or day. This technique works, but because of the differences in cutting skill of individual students, it leaves much to "lady luck."

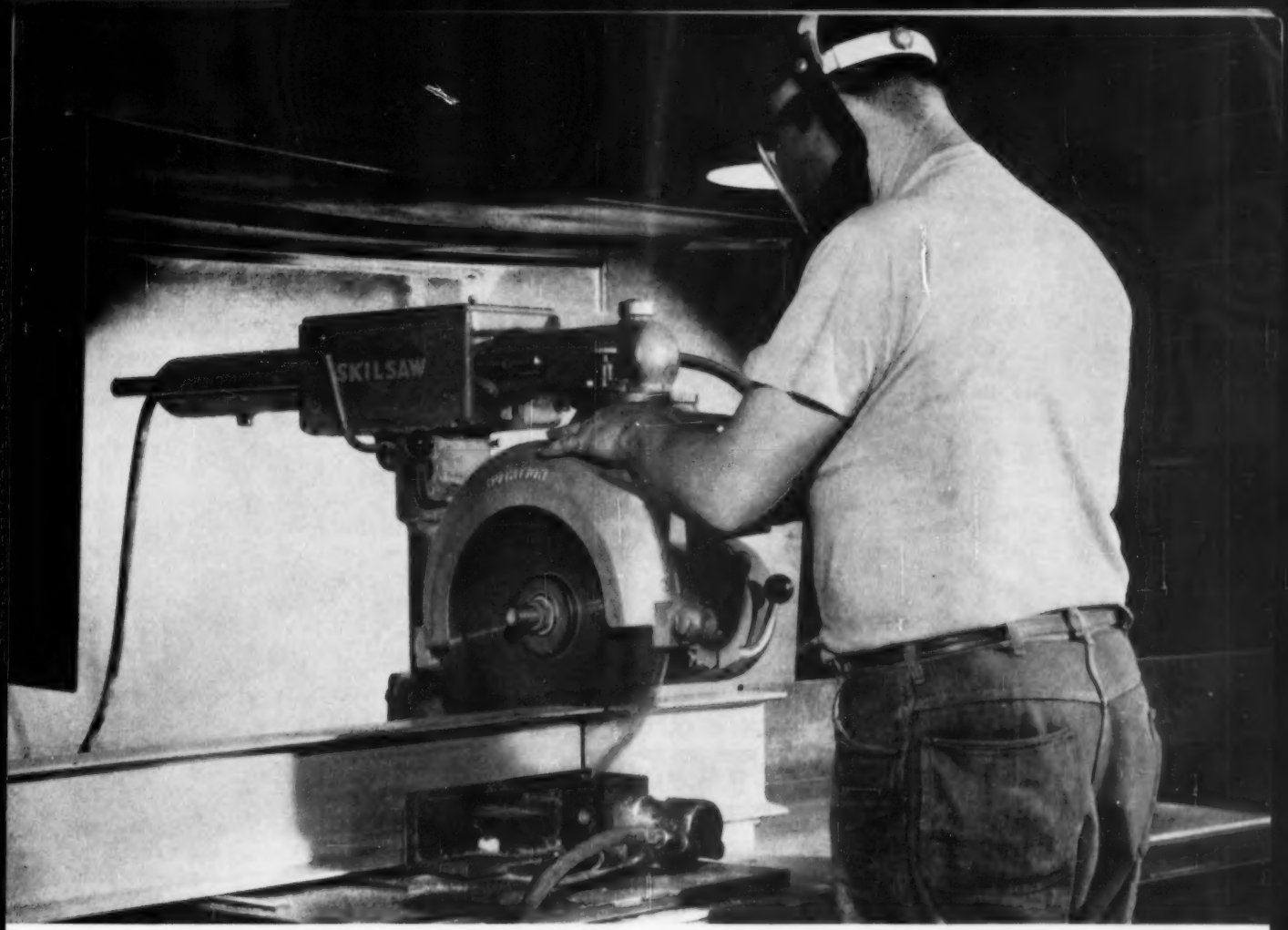
Several class periods will be used to cut the stencil. During this time students have time to prepare the stretching forms outside of class. When a student has completed his stretching form, he should bring it to school, together with some article to be stenciled, in readiness for the time when the screen is completed.

The stretching forms made at home can be cut out of cardboard boxes, but it should be remembered that the form should be larger than the article to be stenciled in order to permit stretching of the material.

It is advisable that the instructor himself adhere the stencil to the screen to avoid possible setbacks. He can appoint a student for this job, but a burned stencil necessitates repeating the whole cutting procedure. After the stencil is adhered to the screen, the instructor can appoint two students to block out the screen and prepare it for printing. Part of the class should be permitted to observe this blocking out and preparation while the instructor uses the time to check other class members to ascertain whether their stretching forms are suitable.

The instructor will find the class full of anticipation when the day for printing arrives. It is well, however, to check each student as he comes to stencil his project to be sure the fabric is stretched sufficiently tight to permit the paint to penetrate the material. After the design is on the fabric the student can release the tension and notice the design "sharpen up." Then he can hang the finished project to dry on a wire stretched across an area in which some air circulation exists.

The silk-screen process is indeed a versatile method of printing, one that can be used to great advantage in creating take-home projects of value and high pupil interest at low cost. ★



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Saves 40% production costs a year!

"Aluminum I-Beams, ⅜" thick, are no problem to cut with a SKIL Radial Saw," says Mr. Ken C. Yandle, plant manager of the Donalson Manufacturing Company, Kansas City, Kansas.

From his experience Mr. Yandle offers first-hand advice to vocational students and instructors. To get cuts from every angle and many different cuts on one 40′ beam, his shop selected the SKIL Model 450 Radial.

"We saved conservatively 40% in production costs the first year!" says Mr. Yandle. "The saw has adapted itself to every aluminum cutting job with more accuracy than any other cutoff machine tried. In fact we are cutting a lot of other materials not originally in our plans."

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No matter what you cut, drill, sand or grind, there's a SKIL Tool that can do the job better, faster, cheaper. Students can learn how to save too. They can save time, work, maintenance when they use SKIL tools. Give them the opportunity now to learn more about savings. See a SKIL distributor and ask him to show you why you, too, can SAVE with SKIL tools.

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- **Clear Work Table** — entire table surface free of overarm obstruction. Perfect for ripping.
- **One-Piece Blade Guard**—top protection at all times.

Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

The Standard Deviation of a Keg of Nails

SINCE the value of research in guiding the march of human progress is generally recognized and since there is a tendency on the part of some people to evaluate a person's standing in the educational world on the basis of the extent to which he has engaged in research work, all ambitious people in education seem eager to get into what some may feel has become a racket.

Unfortunately, people differ in their interest in, and their capacity for, doing research. Those who are gifted in this area of education are rare persons indeed and should be given every encouragement to continue their efforts. They appear to be dissatisfied with things as they are, or they are concerned about why they are as they are. And, strange though it may seem, they oftentimes reveal information which changes completely man's beliefs, thoughts, or actions. They might be likened to the explorer who ventures out into the unknown and charts a course for others to follow.

However, there appears to be a tendency on the part of some college professors to convey the impression to their students that if they hope to be accepted in the higher echelons of the teaching profession they must have had some experience in the field of research. These professors ignore the fact that once the researcher has uncovered truth or principle we still need competent teachers to implement it in terms of a classroom situation.

Now the ability to do research and the ability to do an outstanding job of teaching do not always reside in the same person. When it does occur, the person possessing both qualities should be congratulated. Notwithstanding this situation, we find that in many colleges every graduate student is required to work on a research problem. And so, after much deliberation, they select a topic which they believe is in keeping with their intelligence, and proceed to attack what they are pleased to call "their problem."

As an illustration, consider the case of Bob Jenkins, who is a graduate student at State College. Bob has an enviable reputation as a teacher, but he is confronted with a hurdle which he must overcome if he hopes to get an advanced degree. He is a methodical soul, so he concludes that he had better bestir himself and isolate a problem on which to expend his energy. Apparently it matters not what the problem is as long as it provides opportunities to manipulate a flock of statistical data.

After long and serious study of the situation, he concluded that, insofar as he could discover, no one had attempted to reveal the differences that are present in the contents of a keg of nails. As he proceeded with his study, it soon became evident that there are many different types and sizes of nails, so, in order to limit the scope of his inquiry, he decided to concentrate on the tenpenny nail.

Having made this momentous decision, he prepared an outline and presented it to his doctoral committee for approval. They immediately recognized the real value of the proposed study, and they encouraged him by assuring him that he was about to make a worthwhile contribution to the literature in his field. This flattered Bob quite a little, so he started his investigation by securing a keg of nails of the appropriate type and

Train your Students with the Tools Industry Uses

CINCINNATI TRAY-TOPS

The same lathe that meets the most exacting demands of industry will best meet your vocational education requirements. In capacity, speed range, accuracy and ruggedness, the Cincinnati Tray-Top is an industry-type lathe . . . found in production plants everywhere. Tray-Top trained students will be familiar with the operation of almost any engine and toolroom lathe used throughout the metalworking industry today. Write for details and name of your local Cincinnati Lathe and Tool dealer.

Available in 10", 12½", 15", 18", 21½" and 26" sizes.

- 12 all-geared spindle speeds.
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- Simple color-match speed selector.
- Totally enclosed quick-change gear box.

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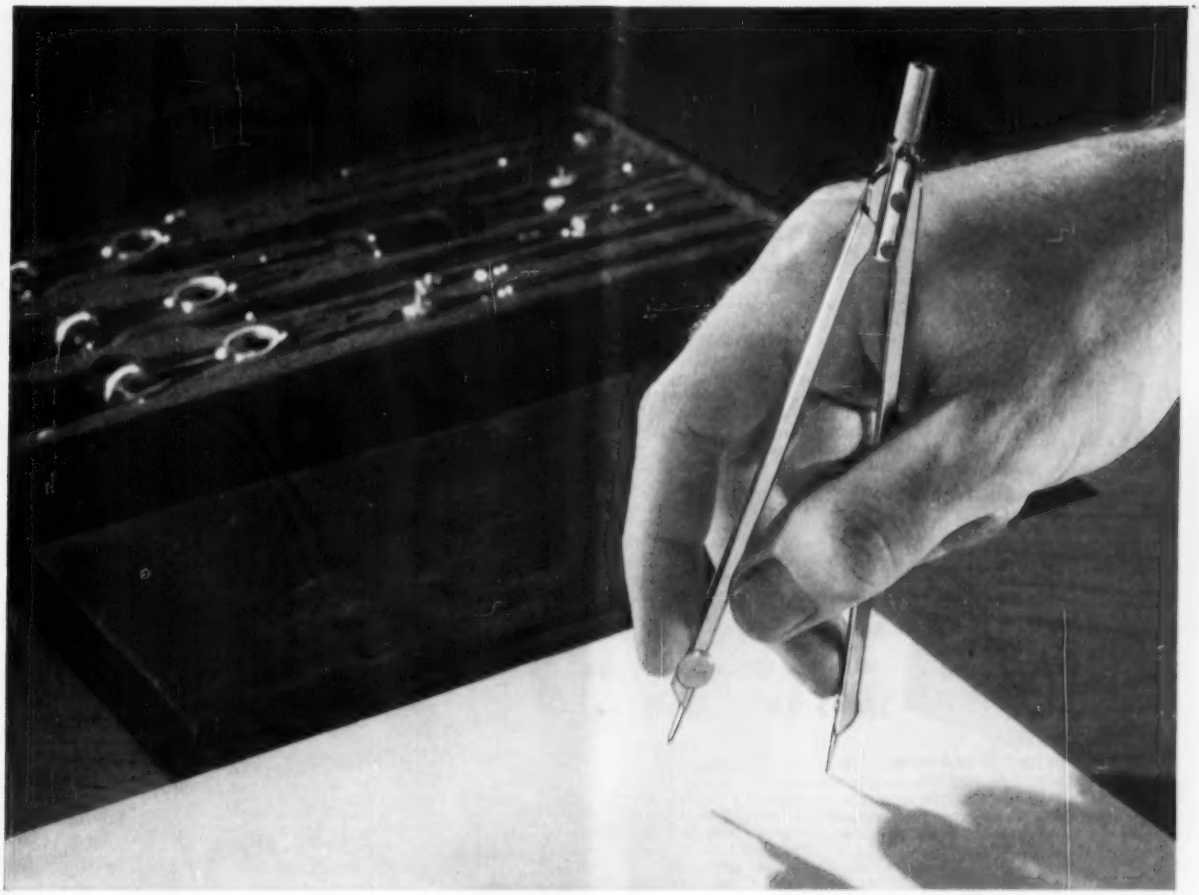
3207 Disney Ave., Cincinnati 9, Ohio
Builders of Engine, Toolroom and Fixed Gap Bed Lathes and a complete line of Drilling Machines



QUESTION: How to tell which drawing instrument set is the better buy?

Answer: *By checking these four characteristics:*

HOW AN INSTRUMENT FUNCTIONS

Carefully examine an instrument's ease of operation and its basic construction features. For example, open and close a POST divider and see how *smoothly* it works. Notice how it *holds position* when open. Look closely at the self-centering gear head and see how this patented feature permits accurate settings with *minimum leg play*.

Next, try a POST bow. Work the adjusting screw and observe the fit between the screw and its threads. There is virtually *no play in the adjustment*. These characteristics are the mark of a "better buy".

HOW AN INSTRUMENT LOOKS

Appearances are often deceiving. Nevertheless, you should make it a point to examine the finish carefully on *all instruments in a set*. With POST instruments, the finish is uniform and durable. POST's base materials and carefully crafted finishes are a good indication of extra years of trustworthy service.

HOW AN INSTRUMENT FEELS

Always check the *feel* of an instrument before you buy. POST instruments, for example, are perfectly balanced and can be handled with ease and accuracy. They are neither too heavy nor too light, but are just the right weight for comfortable drawing.

HOW THE MANUFACTURER STANDS BEHIND THE INSTRUMENT

You can't dissect an instrument to determine if the best metal is used, or the accuracy of craftsmanship. You must put your final reliance on the manufacturer! That's why more people insist on seeing a POST instrument set before they buy. The POST trademark is your assurance of precision and quality—your guarantee of outstanding, long life performance and greater dollar for dollar value. *POST stands behind every instrument sold.*

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size and, with a micrometer, he proceeded to measure each nail in an effort to determine the extent to which they differed.

Among other important discoveries, he found that the nails varied in diameter as much as .003". Altogether he accumulated a mass of data, all of which he tabulated in appropriate form. He used some obscure formulas and calculated the mean of this, the standard deviation of something else, and he was able to establish certain norms, as well as to work out some very beautiful correlations.

He did a splendid statistical job and was complimented by his committee on his thoroughness. We are not sure whether it was the profound discoveries he had made in regard to nails, or because he had uncomplainly overcome a hurdle that had been placed in his path, but he got his Ph.D. and returned to his school to resume his pleasant job of teaching.

Admittedly this illustration is slightly overdrawn, but is it any more ridiculous than some of the productions that are labeled as research? We very seriously doubt it.

Education is faced with countless problems that need to be solved, but let us not forget that we have excellent teachers who have no aptitude for research. Let us leave the problems to those who are qualified to solve them, and let the excellent teachers teach. We have need of them. Let us give credit where credit is due; to the research specialist for his contributions to human knowledge, but also to the teacher who has the skill to use these contributions in his efforts to become more effective in the area of education in which he excels. ★

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YES, SIR! TODAY WERE FEATURING THIS 24 INCH LONG 12 POINT CROSSCUT MODEL. JUST LOOK AT THE SET IN ITS KERF!
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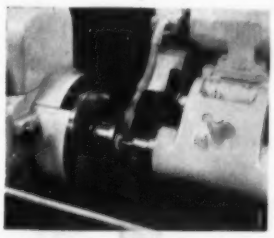
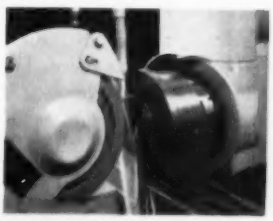


Internal grinding. The internal grinding head is permanently hinge mounted; does not interfere with other setups.



Face grinding. For this type of setup the headstock is swiveled 90°. The chuck is standard equipment.

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CINCINNATI

The guidance a shop teacher can offer is important in

Recruiting for the Trades

By Benjamin Novak

Vice-Principal, Frankford High School, Philadelphia, Pennsylvania

A WELL-KNOWN and perhaps tiresome story is that we are in the midst of a great tug-of-war in the labor market for the services of the too-few young men and women who were our "depression babies." The latest report of the United States Bureau of Employment Security reemphasizes acute shortages of engineers, teachers, and skilled workers, especially draftsmen, toolmakers, and machinists, to mention only a few. Other sources estimate a deficit of 100,000 skilled workers in the automotive industry.

The trades are still getting too few recruits proportionately, and many of them are not "first-line" material. Some of the factors are beyond our control, but there are many ways in which each shop teacher can help.

Since most of the strength of industrial education comes from people in the front lines, and our job, after all, is to do what we can with what we get in our shops, here are some ideas that you might want to think about:

Make sure that your students learn the occupational opportunities in the industry you are teaching and in related fields. All kinds of reading and display materials can be had for the asking, as readers of SCHOOL SHOP know. An attractive bulletin-board poster on the automotive industry, for example, has just been made available by Chilton Publishing Company in Philadelphia.

Regard exploratory courses as an opportunity rather than a burden. It is admittedly difficult to work with the immature, "uncommitted" students who come to your shop for exploratory instruction. In all your recruiting efforts, it is well to remember that high-pressure "arm-twisting" methods are unsound. A student who is pressured into making a premature choice may be harmed, and so, deservedly, will be our whole cause. The main responsibility is to help each student make the decision that seems best for him.

Know your industrial advisory committee, and give its members every opportunity to know you and your teaching needs. They can help with publicity, placement, and instructional materials. They can supply speakers, industrial visits, and countless other things to make your program sound and up-to-date.

Don't overlook regular industrial experience. This gives you leads on placement and other guidance information, besides bringing reality to your teaching. A good, well-prepared graduate is your best recruiting argument.

You are an ambassador for vocational education. Where possible, take part in career conferences at your "feeder" schools and elsewhere. Arrange exhibits, open-house programs, and selective participation in contests and community projects. Vocational education should be selective, but selection is of little value if potentially good students are not encouraged to knock on your doors and seek admission.

The majority of people who are critical or lukewarm about vocational education haven't even seen it in operation. Invite the critics in to see for themselves, rather than leaning on heated debate and other verbalism.

Knowing about and helping with matters other than your own immediate needs enables you to keep your own in better perspective. Moreover, people are justifiably skeptical about a person who seems to be "grinding his own axe." It is wiser to win support for your cause by being sympathetic with others.

Recruitment for industry may be likened to an endless true story. It must not be once told, but repeated many times. Some people are too young to have known the depression, World War II, or other important events. All of us have fading memories of the magnificient defense-training and war-production programs, as more immediate day-by-day details crowd in. Recruitment is the continuing duty of everyone. It is a battle that is never won. The contribution of one shop teacher can seldom be evaluated or credited, but the combined efforts of all are sure to produce a great tide of success. ★

happenings in industrial education

Radio-TV Seminar

THE Radio-Electronics-Television Manufacturers Association announces it is again offering a three-week teacher-training seminar this summer to help schools modernize, improve the level, and extend the scope of instruction in the training of radio-electronics-television technicians.

The seminar, which is being offered jointly by RETMA, the New York State Education Department, the University of the State of New York, and the New York Trade School, will be given July 8-12 in the New York Trade School.

For further information on the seminar, radio and television instructors may write to Donald H. Stover, RETMA service coordinator, 1721 DeSales St., N.W., Washington 6, D. C.

Expansion at Stout

PLANS for a new $725,000 multi-story metal shop and classroom structure at Stout State College, Menomonie, Wis., are included in an extensive building program recently outlined by Verne C. Fryklund, president of the college.

The new shop building will be located where the Dunn County Agricultural High School and the Dunn County Teachers College now stands. All metalworking activities will be located in the lower floors. Offices and classrooms for certain academic areas will occupy the upper floors.

Change at Carbondale

A REORGANIZATION at Southern Illinois University, Carbondale, affecting the department of industrial education, was recently announced.

The department of industrial education and the department of applied science have been placed in a new division of the school, separately administered through the president's office. The industrial-education department will train undergraduate and graduate teachers, assist in the training of industrial supervisors, and offer service courses in pre-engineering and applied science. The applied science department will take over the pre-engineering program and work in unison with the industrial-education department to develop industrial supervisory and applied science programs.

Ralph O. Gallington, former professor of industrial arts at Pennsylvania State

University, has been named chairman of the industrial-education department and acting chairman of applied science.

The Judgment Month

JUDGING of more than 40,000 entries in the annual Industrial Arts Awards competition sponsored by Ford Motor Company will begin this month at student craftsmen's fairs in nearly 50 cities in the U.S. and Canada.

Approximately 5,000 projects which win top ratings in local exhibits will be sent to Dearborn, Mich., for final judging in mid-July. Projects are entered in 14 divisions in either the junior-high or senior-high school class level.

AIAA to Go to Boston

ANNOUNCEMENT has been made by Ely Van Hart, convention director of the American Industrial Arts Association, that the 1958 convention of the association will be held in Boston, Mass., April 29-May 2.

The 1957 meeting of the association was held in April in Kansas City.

New N.J. School

THE new Essex County Vocational and Technical High School, Irvington, N.J., which was dedicated and opened this school year, is designed to accommodate 700 pupils and to offer facilities that will provide them with all that is needed to learn hand skills, technical knowledge, and academic subjects.

The present program of courses includes automotive repair and service, carpentry, electrical construction and maintenance, machine shop, manufacturing technics, sheetmetal work, technical industrial electricity, tool and die making, and a basic ninth-grade program in general shop. Additional courses will be available within the next two years.

The former school, which served the area since 1926, has been renovated and presently forms a wing of the new building.

Idaho Assn. Elects

THOMAS MATTHEWS of South Fremont High School, St. Anthony, was elected president of the Idaho Industrial Arts Association at its recent annual convention in Boise. Formerly vice-president of the organization, Mr. Matthews succeeds Asael Bell of Preston High School.

Chester Colwell, industrial-arts supervisor, Boise, was named vice-president; and Martin Metz, North Junior High School, Boise, was elected secretary-treasurer. The retiring secretary-treasurer is John Findlay, Fielding High School, Paris.

Teacher of the Year

W. A. MAYFIELD, head of industrial arts at Snyder, Texas, was named "industrial-arts teacher of the year" at the ninth annual industrial teacher conference recently held at Texas A & M College, College Station. *

Convention Calendar

New York State Vocational and Practical Arts Association, Rochester, May 2-4

North Carolina Industrial-Arts Association, Charlotte, May 2-3.

Wisconsin Association for Vocational and Adult Education, Madison, May 3-4.

Oswego Industrial-Arts Spring Conference, State Teachers College, N.Y., May 9-10.

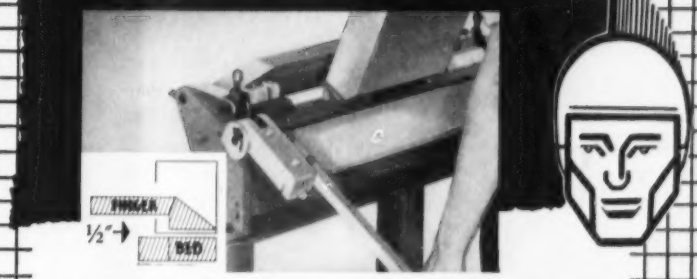
Georgia Vocational Association, Biltmore Hotel, Atlanta, June 13-14.

Pelican State Vocational Association, Southern University, Baton Rouge, La., July 9-13.

International Graphic-Arts Education Association, Rochester Institute of Technology, N.Y., July 28-Aug. 2.

American Vocational Association, Philadelphia, Pa., Aug. 5-9.

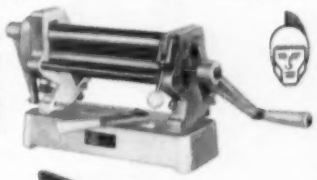
NEW SPARTAN MODEL 24
A DI-ACRO BOX AND PAN BRAKE



FORMS BOXES AND CHASSIS WITH UP TO ½" FLANGE

The Spartan's new design and rugged construction was planned specifically for school shops. Hardened Box Fingers are undercut to allow the forming of chassis and boxes as deep as 3" with lipped edges as large as ½" across. Material clearance of 1" between the Box Fingers and the Bottom Plate allows for easy insertion and removal of material. The Spartan bends 16 gauge mild steel up to 135° in one operation. It can also be used as a radius former and bar folder. An adjustable back gauge and a simplified stop control are standard equipment, *available in 24" width only.*

SPARTAN MODEL DI-ACRO ROLLER
Built exclusively for school shops in five widths, 12" to 36", all with 2" machined rolls. Form smooth cylinders with radii of 1" and larger in sheet-metals up to 16 gauge. Heavy welded steel and cast construction.



DI-ACRO SHEAR
An industrial tool available to schools in 6", 9", 12" and 24" widths. Capacity 16 gauge steel.

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Mr. Mayfield was chosen from a field of 10 candidates who represented the 10 area industrial-arts clubs in Texas. The selection represented approximately 700 industrial-arts teachers in Texas.

Mr. Mayfield, who helped organize the Texas Industrial-Arts Association, served as temporary chairman during its organizational period, and later was elected as president. He is also a former vice-president of industrial arts in the Texas Vocational Association.

Massachusetts Fair

THE Massachusetts Industrial Education Society is making plans for its 11th annual spring convention and industrial-arts fair, May 18, in the Meadowbrook Junior High School, Newton Centre.

Joseph Slyva, industrial-arts consultant at Newton, is general chairman for the fair.

Newly-elected officers of the Massachusetts association are: Leo Gittzus of Lexington, president; Arthur Stickler of Natick, vice-president; Gerard Antonellis of Stoughton, secretary; and Robert Irving of Newton, treasurer.

Kurland Reelected

THE Florida Industrial Arts Association at its annual business meeting in March at the University of Tampa reelected Bernie Kurland president for another term.

Dean Rickey, Lakeland, was named vice-president; and Billy Brown, Bartow, was elected secretary-treasurer.

Charles R. Crakes, educational consultant for the DeVry Technical Institute, gave the principal address of the meeting on "Technological Opportunities for Youth." John Tammeryn, supervisor of industrial arts and safety director for Hillsborough County, reported on safety in Florida industrial-arts education, and Ed Kurth, state consultant for industrial arts, reported on the progress of industrial-arts education in Florida.

Local Associations

SPRING is a busy time for many local and area industrial-education organizations. Among the activities recently noted are the following:

The Southeastern Zone Industrial Arts Association of New York will hold its annual industrial-arts project exhibit at the Monroe-Woodbury Central School, Central Valley, on May 24. Arthur Hauler, chairman of industrial-arts education, State University of New York Teachers College, Oswego, will speak at the evening banquet.

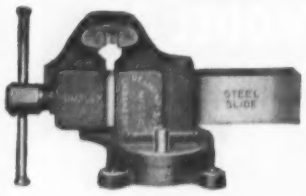
The South Jersey Industrial Arts Association will hold its 32nd annual banquet May 8 in the Presbyterian Church, Glassboro, N.J. The banquet will close the winter program of the association.

The Los Angeles City Industrial Education Association held its spring stag party in February with school principals and administrators as guests.

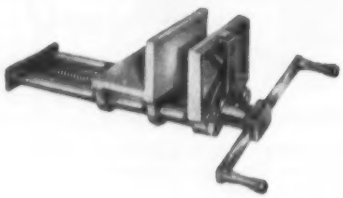
The St. Louis, Mo., County Industrial Arts Association has elected the following officers for 1957: Allen Goodridge, Hazelwood, chairman; Fred Castle, vice-chairman; and Bailey Birkhead, University City, secretary-treasurer.

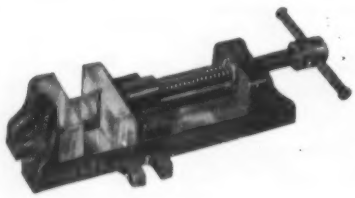
The Central Minnesota Industrial Arts Association, in conjunction with Minnesota State Teachers College, St. Cloud, sponsored an industrial-arts workshop at the college, February 8-9. Ray Larson, head of the industrial-arts department at the college, was director of the activities.

Robert Thompson, chairman of the department of vocational education at New York University, led a panel discussion on "The Recruitment of High-School and College Students for Industrial-Arts Teaching" at a recent meeting of the New York City Association of Industrial-Arts Day High Schools at New York University. Members of the panel included Arthur Ahr, Max Komow, Paul Fromer, Raymond Van Tassel, and Albert Spellman. ★



machinists vise


woodworkers' vise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utility vise

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Woodworkers' vises have full 7/8" diameter guide rods with reinforced tie bar for smooth, dependable operation. Jaw faces are accurately ground.

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GORDON O. WILBER, director, division of industrial arts at Teachers College, State University of New York, Oswego, will retire in June. For many years an active member of his profession, Wilber also served as a member of the editorial advisory board of SCHOOL SHOP. He now plans to head a four-man team charged with the responsibility of developing an industrial-arts teacher-educator program in the Philippine Islands. The mission will take him to the islands for a period of two years. ROBERT HELSBY has been appointed acting director of the industrial-arts division at the college.

EDWARD FINSTON has been appointed principal of Manley Vocational School, Chicago, Ill.

MAXIMILLIAN KOMOW has been named supervisor of student teachers at New York University.

JOHN HURLEY, supervisor of industrial arts, New York, N.Y., has been named vice-president of the American Council of Supervisors of the American Industrial-Arts Association.

PETER E. TOBIA has recently been appointed as arts and crafts educational specialist with the United States Overseas Mission in Addis Ababa. The mission, an agency of the state department, is operated by the International Cooperation Administration. Tobia had been an industrial-arts teacher in North Arlington Junior- and Senior-High School, Maywood, N.J., for the past three-and-a-half years.

BYRON WEST, former building and trades instructor and principal at Carthage, Ill., has been appointed supervisor of T & I education at East St. Louis. He succeeds MICHAEL HUBIAN who died recently of a heart attack.

JOSEPH A. KING, JR., retired recently as director of Manley Vocational High School, Chicago, Ill. His career spanned 44 years as teacher and administrator.

LEWIS W. LONG has been elected T & I educational coordinator at Meridian, Miss., public schools. Long is a recent graduate of Mississippi State College.

FRANK E. SCHNEIDER, associate professor of industrial-arts woodworking at Teachers College, State University of New York, Oswego, N.Y., is scheduled for retirement in June. He joined the Oswego faculty in 1926. ★

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☐ STACKING CABINETS	☐ BUNK BED	☐ ODDS 'N ENDS CABINET
☐ BUFFET STORAGE CABINET	☐ BOAT BED	☐ 5' SAILER
☐ UTILITY SHELVES	☐ TRAIN TABLE CABINET	☐ 15' SAILBOAT
☐ TOOL-CABINET WORKBENCH	☐ COVERED SAND BOX	☐ 20' SAILBOAT
☐ DOUBLE DUTY DESK	☐ TOY STORAGE BLOCKS	☐ 11'3" OUTBOARD
☐ COFFEE TABLE	☐ PORTABLE GARDEN CADDY	☐ 9' FLAT BOTTOM DINGHY
☐ BEDSIDE TABLE	☐ SECTIONAL PATIO TABLES	☐ 7'9" PRAM DINGHY
☐ STUDENT'S DESK	☐ OUTDOOR SERVING WAGON	☐ 13'4" OUTBOARD
☐ CHEST OF DRAWERS		☐ 13'6" INBOARD RUNABOUT
☐ TWO-DOOR CABINET	☐ SUN SLED	☐ HOG HOUSE
☐ TV STOOLS	☐ GARAGE STORAGE BOX	☐ POULTRY HOUSE
☐ CHILD'S TUMBLER	☐ GARDEN CABINET	☐ ROLL-AWAY POULTRY NEST

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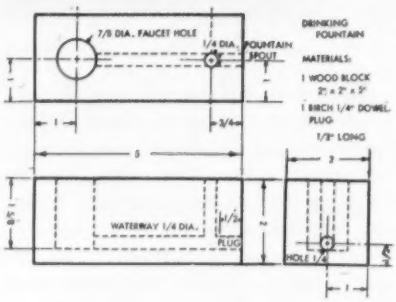
A Tip with a Point

It's a simple matter to turn a round-pointed soldering bit on a machine lathe from copper rod stock. Then tin it and make ready for soldering (above left). But, it won't work. Neither will a square soldering copper bit that has become round and blunt from overheating. So, to get around this, make sure the bit has clean sharp corners (shown right) along the tip from which the heat can easily be transferred to the metal being soldered. This makes a good teaching aid to dramatize the heat transference necessary.—*Charles M. Rice, Western Washington College, Bellingham.*

Micrometer Protection

Discarded eye-glass cases, the metal variety, make ideal holders for micrometers. The cloth already glued on the inside gives added protection from dust and dirt and micrometers from 0 to 1" fit in the case nicely.—*Russ Hayes, Dixon, Illinois, High School.*

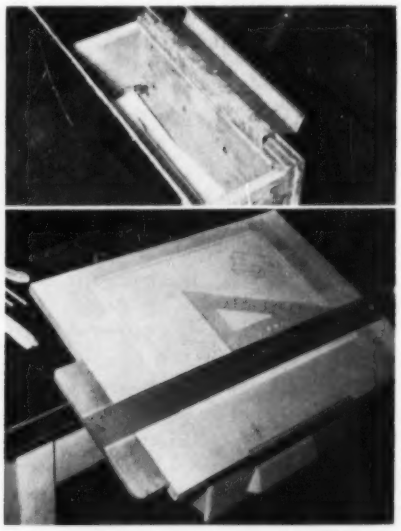
Relieves Those Thirsts



Here's a drinking fountain that we've found simple to construct and which goes a long way in easing the problem of "going for a drink of water." With warmer weather now here, this should be of interest.

It can be modified to fit any faucet in a shop. It should be made of moisture-resisting wood such as mahogany, pine, cypress, cedar, redwood, maple, or cherry. To assure longer use of the fountain, soak the finished piece in water from 24 to 48 hours, allowing the block to swell and retarding the splitting action of the wood. The fit of the fountain can be adjusted by wrapping paper or adhesive tape around the spout to assure tightness. One more tip: remove the faucet handle after the fountain is adjusted to prevent students from playing around with the height of the water stream.—*Edward B. Ray, Wisdom Lane Junior-High School, Levittown, N.Y.*

Jiffy Drawing Table



By attaching a sheetmetal bracket to the inside of a drawer (top photo), we've been able to adapt regular planning tables for use in our drawing class.

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. . . safer to operate, easy to learn on

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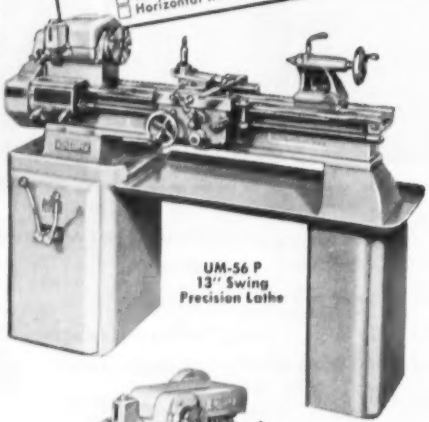
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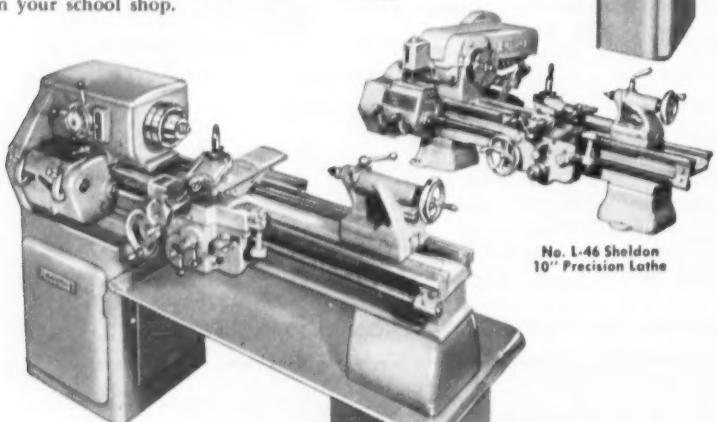
Precision Lathe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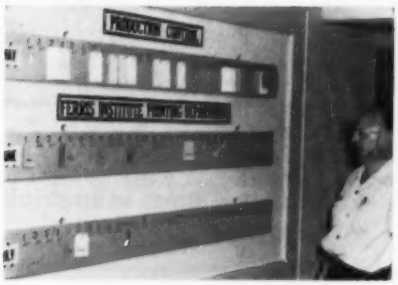
When *not in use* the hinged bracket neatly flips inside the drawer. When *in use* the lip of the bracket securely holds the bottom edge of the drawing board (bottom photo). — *Donald Amelon, Salisbury, Mo., High School.*

Stop Pinching

A short length of coil spring stretched tightly around the handle and the end of the vise screw, with the ends of the spring hooked together, will overcome the tendency of the shop machinist's vise to pinch the fingers of students.—*Harvey Muller, Box 6, Danboro, Penn.*

Production Control Board

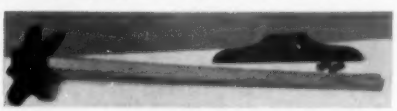


A production control board is an economical and effective aid to job control. It permits an almost instant and accurate inventory of work in progress. The board at Ferris Institute's print shop holds information on 200 jobs per 12-week quarter. It is made of a piece of plywood 3½′ x 6½′ painted a light buff color. On this are mounted three light green panels, 6″ x 5½′, with right-angle screws—one for each day of the month—set every 2″ the full length of the panel. A system of colored control cards gives a visual day-by-day record.

To be effective, it is important that the board be under immediate charge of one person only. At Ferris a student is in charge. Each move of a job from one department to another is checked daily.

The bindery department, which is responsible for delivery of all jobs, supplies a daily list of all completed work. —*Kenneth L. Ross, Ferris Institute, Big Rapids, Mich.*

Salvaging T-Square Heads



The next time a T-square blade in your drawing room breaks, or is damaged beyond use, don't throw it away. Remove the head and cut a semi-circular slot in it. With a couple of carriage bolts, fasten it to another T-square. This makes a handy drawing instrument, one which has a stationary right angle but also one which can be adjusted to a variety of angles. To make the slot as illustrated, cut it with either a jig saw or set up a jig on a drill press. Two 1¼″ x ¼″ carriage bolts will do for the fastenings.—*Arthur F. Schuster, Charles B. Gaskill Junior-High School, Niagara Falls, N.Y.*

Substitute Tips

If crutch tips are not available for wrought-iron legs, make a substitute from rubber tubing. Cut the tubing of the desired diameter to the required length and seal one end with Miracle Adhesive or a similar cement.—*Howard R. Schramm, Shadyside High School, Shadyside, Ohio.*

Roll It On

When applying cutting oil to sheet-metal or metal stock which is to be stamped, planed, or milled, use a paint roller. You can do the job quickly and easily this way.—*R. M. Woodbury, Wellesley Junior-High School, Wellesley, Mass.* ★

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IN THE *Morning Mail..*

[Brief comments about SCHOOL SHOP and the field it serves are invited. Address the Editor, SCHOOL SHOP, Ann Arbor, Michigan.

Dear Sir:

I just wanted to drop you a note of commendation for the editorial, "Whose 'Con Game'?" that appeared on page 2 of the February issue of SCHOOL SHOP. I think your comments were very timely and to the point. It is unfortunate that your observations do not have the distribution that the *Reader's Digest* has since the people who would most need to read this article would normally be those who would not see SCHOOL SHOP.

William G. Loomis,
State Supervisor, T & I Education,
Oregon Department of Education

Dear Sir:

After reading the article, "Whose 'Con Game'?" in the February SCHOOL SHOP magazine, I cannot help but drop a word of congratulations to the author, Tom Diamond.

Such a statement by Driscoll certainly shows ignorance or probably prejudice which he might be parroting to benefit other factions. I, too, have been aware of an undercurrent of an anti-federal aid trend toward schools. In fact, and you are perhaps aware of it, such benefits have been labeled communistic in nature.

I have often wondered if it could be the result of heavy taxation necessary in education that prompts certain groups to support propaganda of this nature.

It is definitely too bad that your reply could not have been given space in the same magazine.

My hat is off to such outspoken analysis.

Elton R. Favell,
Wausau School of Vocational
and Adult Education
Wausau, Wis.

Dear Sir:

In the rush of daily teaching activities I seldom have time to write the thoughts of appreciation that I feel when I receive and read your SCHOOL SHOP magazine.

In every issue I find some article which arouses my interest. Keep up your good work. I strongly believe that your organization is definitely helping to educate the youth of our country through the instructors who read and apply the illustrated ideas from your magazine. Thank you once again.

J. L. de Polo,
Sequoia High School
Redwood City, Calif.

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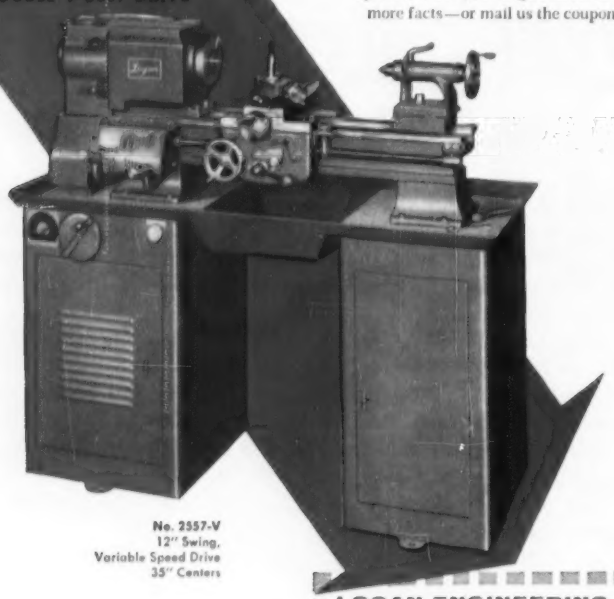

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Whole Town Benefits

Everyone in Brighton, Iowa, young and old, is benefiting from work done by shop students in the community.

The youngsters are having a good time playing on a rebuilt and relocated —from the city park to a school playground—merry-go-round. The PTA has 12 new, folding-leg tables, and the high-school athletes are busy using a dozen new hurdles built by the shop students.

Future plans call for the renovation and relocation of another playground toy (the youngsters call it a "washing machine"); construction of three paper-removal-disposal containers, with flower-box tops, for the community's downtown; and painting and decorating their own school with murals.

In Brighton, everyone knows their shop students are busy.

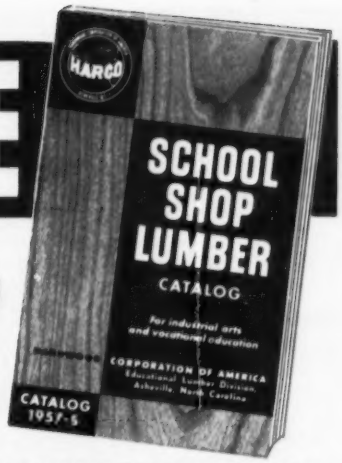
Community-Wide Exhibit

The industrial-arts departments in the Midland, Mich., schools have figured prominently in the annual school-wide exhibits.

The exhibits are part of the integrated-areas shows that are scheduled annually to coincide with Parent-Teacher-Student Association meetings that are generally held in the spring.

The prime purpose of the exhibits is not to sell its program to the citizens of Midland but rather to show the good people what they are getting for the tax dollars they are paying each year for education. ★

FREE



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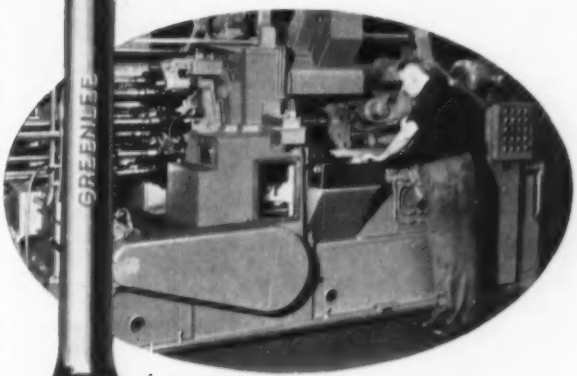

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instructional Resources

Books:

Vocational and Practical Arts Education. Roberts. New York: Harper & Brothers, 1957. Pp. x+637. $6.00.

This book is designed for those who are interested in the training of vocational teachers or who have the responsibility of administering a program of education in the vocational field.

It will be useful as a text for courses concerned with the history, development, and administration of a school-shop program.

The book contains factual information and general principles concerning vocational and practical-arts education which should enable the reader to understand the important characteristics of the various areas in the field.

Roy W. Roberts is in charge of vocational teacher education at the University of Arkansas, Fayetteville.

103 Jig Saw Projects. Mix. Chicago: Goodheart-Willcox Co., 1957. Pp. 80. $1.50.

Anyone interested in jig-saw work will find in this book a wealth of suggestions in regard to projects for elementary woodworking classes. Many of the designs may be used for decorative purposes while others can be assembled into useful articles or toys.

Floyd M. Mix is president of the Goodheart-Willcox Co.

Research in Industrial Education. Washington, D. C.: U. S. Office of Education, Vocational Division. Bulletin No. 264, T & I Series No. 65, 1957. Pp. vii+527. $1.75.

This bibliography of summaries of studies in industrial education covers the period from January, 1930 to August, 1955. The studies have been classified in a series of categories that reflect the areas of research mentioned most frequently in inquiries and discussions.

The list is quite comprehensive, and should be helpful to researchers who are interested in the research work that has been done, or who are exploring the field in an effort to discover new problems on which to work.

Contemporary Metal Home Furnishings. Lux and Towers. Bloomington, Ill.: McKnight & McKnight Publishing Co., 1957. Pp. 185. $3.50.

The first six chapters of this book are devoted to a discussion of materials, processes, and procedures. These are followed by 58 suggested projects, each one of which is presented by means of a picture, a drawing, and a list of the materials required.

Teachers in the area of general metals will find the book to be a rich source of ideas for their pupils to draw on.

Donald G. Lux and Edward R. Towers are well qualified to produce a book of this kind as they have been teaching design for a number of years. They are both assistant professors, the former at the University of Illinois, and the latter at Ohio State University.

Machine Tools for Metal Cutting. Armstrong. New York: McGraw-Hill Book Co., 1957. Pp. ix+347. $5.00.

College students, as well as those being trained as engineering technicians, will find in this book an excellent treatment of machine operations. It should be particularly helpful when used to supplement the laboratory work usually done in school machine shops.

While some machines have been omitted, the description of those included provides the reader with a comprehensive picture of their construction and operation.

W. H. Armstrong is professor of industrial engineering, Pennsylvania State University, University Park.

Repairing TV Receivers. Glickstein. New York: John F. Rider Publisher, Inc., 1957. Pp. v+206. $4.40.

The primary emphasis in this book is on troubleshooting techniques and practical TV servicing shortcuts.

It is not a textbook of TV theory. It is assumed the reader has an elementary knowledge of the field and is familiar with basic test instruments.

Although experienced technicians may disagree with the suggestions made, the methods presented here will be found to be practical, and should serve as a guide until the reader develops other methods he may prefer.

Industrial Control Instruments. Delahooke. Albany, N. Y.: Delmar Publishers, Inc., 1956. Pp. v+167. $4.75.

Automatic control has been applied to so many processes in modern industry that a book of this kind is quite timely. It contains a description of the various units used in the control of industrial equipment, and the descriptions are illuminated by numerous detailed drawings. This type of presentation should simplify the task of the serviceman who must be familiar with the internal construction of the various parts. All types of mechanical and electrical controls are covered, except electronics.

The book should be of special value as a guide to the modern industrial technician.

Metallic Rectifiers — Principles and Applications. Crow. Indianapolis: Howard W. Sams & Co., Inc., 1957. Pp. vi+280. $3.00.

This book presents the theory, principles, and applications of the three most commonly used metallic rectifiers: the copper-oxide, the magnesium-copper sulfide, and the selenium. Included in the discussion also are rectifier circuits, the application of power rectifiers and

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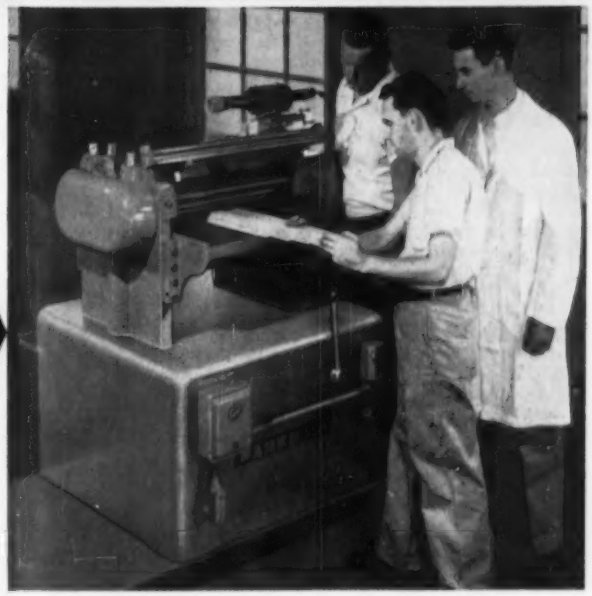

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small current rectifiers, instrument rectifiers, and rectifiers used as electric valves.

At the back of the book, electrical and rectifier terminology is presented along with a classified list of metallic rectifier manufacturers, and an extensive bibliography for those who desire to carry on further study of the subject.

Leonard R. Crow is a recognized authority in the field of electronics and is the author of several articles and books on the subject.

Practical Carpentry. (Fourth Edition). Mix and Clrou. Chicago: The Goodheart-Willcox Co., 1957. Pp. 480. $5.00.

Practical Carpentry is intended to be used as a text in trade classes in the public schools, and as a guide in the training of apprentices.

It should also be helpful for anyone who is contemplating remodeling his home or building a new one. It provides all the information needed to enable a person to do an acceptable job on such projects.

Floyd M. Mix is president, Goodheart-Willcox Co., Inc. Ernest H. Cirou is an instructor in the carpentry department, Washburne Trade School, Chicago, Ill.

Manufacturing Methods and Processes. Ansley. Philadelphia: Chilton Co., 1957. Pp. xv+561. $12.50.

This book is designed to give the industrial engineer or executive a broad general background on the latest developments in manufacturing methods and processes.

The author does not pretend to provide instruction for the experts in the various fields covered. However, he does present a comprehensive view of modern production methods, and he suggests applications of some of the newer processes to the problems of production that may appear in an industrial plant.

The book should find ready acceptance as a text in engineering colleges, since prospective engineers will find it to be a valuable aid in orienting them in what they will encounter when they enter industry.

Arthur C. Ansley is president of the Ansley Mfg. Co., and is a member of the American Society of Tool Engineers.

Blueprint Reading and Sketching for Plumbing Trades. D'Arcangelo, D'Arcangelo, and Guest. Albany, N. Y.: Delmar Publishers, Inc., 1956. Pp. vii+119. $2.50.

This book was developed to fill a need for a course to meet the requirements of workers in the plumbing and steamfitting trades. It is not intended to develop draftsmen.

The text includes a series of units, each one of which is well illustrated. An additional feature of the book appears in the form of two packages of practical blueprints. One of these shows in complete detail the plans of a residence. The other shows in a similar fashion the plans for a commercial establishment.

Bartholomew D'Arcangelo and Benedict D'Arcangelo are practical plumbers with wide experience, and are plumbing instructors at the McKinley Vocational School, Buffalo, New York. J. Russell Guest is a qualified mechanical engineer. He teaches related subjects at McKinley Vocational School and has served as a curriculum specialist with the New York State Education Department.

Pamphlets:

Three Dimensional Teaching Aids for Trade and Industrial Instruction is a 91-page booklet using three-dimensional illustrations as teaching aids. Included are aids on aircraft, auto mechanics, bricklaying, carpentry, mechanical drawing, etc. Published by U. S. Department of Health, Education, and Welfare, Office of Education, it is available from U. S. Government Printing Office, Washington, D. C. Price 45c.

What Makes Education Vocational, by J. Fred Ingram, 1956 president, American Vocational Association, is a 10-page pamphlet that discusses the differences of vocational education and general education. He analyzes the place of human relations in vocational training and places limits on the proportion of time that should be devoted to it. Available free from the American Vocational Association, Inc., 1010 Vermont Ave., N. W., Washington 5, D. C.

Audio-Visuals:

Industrial Education in Your Future is a 21-minute, sound, color film aimed at showing high-school students how their interests in industrial education may be directed toward a college career or a career in industrial technology. Send your requests to John A. Jarvis, dean, division of industrial education, Stout State College, Menomonie, Wis.

American Drawing Series is a compilation of three sets of visual aids—six filmstrips, eight films, and seven follow-up filmstrips dealing with mechanical drawing. Write McGraw-Hill Text-Films, 330 W. 42nd St., New York 36, N. Y.

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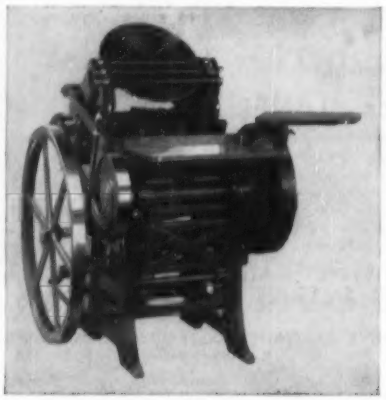

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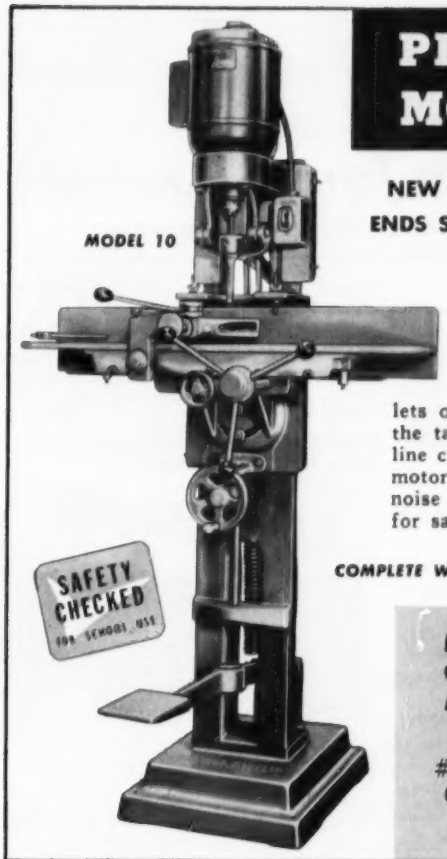

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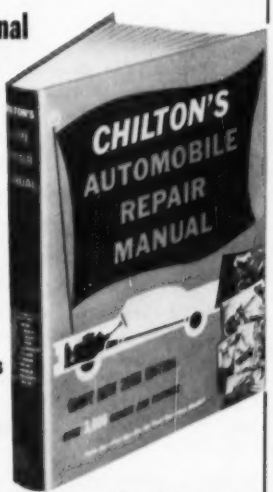

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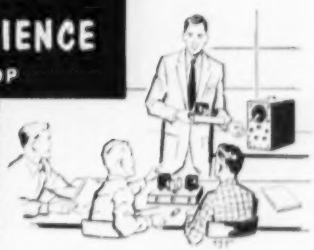

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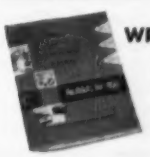

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news from Industry

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Machine Products Dresser Features "Easy-Change" Cutters

The new dresser introduced by Machine Products is said to be a time-saver and economic tool because of the quick-change cutter assembly.

The manufacturer claims new cutters can be installed without completely dismantling the assembly. They say the parts saving comes from Machine Products six-holed bearings. The cutters are milled of hardened steel instead of punched, with more steel in the long cutter teeth. The dresser handle is slightly curved and has a bicycle-grip handle which makes for safer operation and accurate work on high-speed wheels.

For more information write to Machine Products Corp., 125 Hollier St., Dayton, Ohio, mentioning SCHOOL SHOP; or *circle no. M1 on the business-reply card.*

Trouble-Shooting Panel Simulates Real Thing

H. H. Buggie, Inc., has introduced a radio trouble-shooting panel that allows as many as 25 new assignments to be given a student by the "flick of a switch," the firm has said.

The company asserts the unit is a work station by itself and that only the most basic radio equipment is needed to conduct a course in radio repair. As illustrated, the panel comes in a handy valise equipped with latches and carrying grip.

For additional information write to H. H. Buggie, Inc., P.O. Box 817, Toledo 1, Ohio, mentioning SCHOOL SHOP; or *circle no. M2 on the business-reply card.*

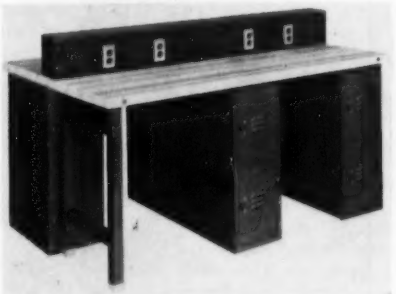
Evans "Power-Tape" Has Novel Features

The new pocket-size steel white tape introduced by the Evans Rule Co. features several innovations which the manufacturer feels will appeal to users.

High on the list is the controlled speed at which the extended tape can be returned to the tape housing. With the patented speed control mechanism, the user's fear of the blade whip-lashing are removed, the firm claims. The internal control mechanism is made of molded nylon. The tape comes in 6', 8', 10', and 12' lengths. The tape box also features a built-in magnifying lens on the lid which can be used for easier reading of a measurement.

For additional information write to Evans Rule Co., 400-416 Trumbull St., Elizabeth, N.J., mentioning SCHOOL SHOP; or *circle no. M3 on the business-reply card.*

Parent Metal Announces New Electrical Benches



The new Parent Metal double, locker-base electrical bench features eight duplex receptacles, four on each side.

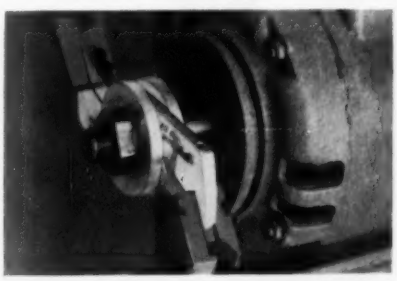
In addition, the bench includes eight lockers, four on each side. The working surface is 72" long, 60" deep, and 32¾" high. Its surface is laminated edge-grain maple, 1¾" thick, and comes in two sections, each 30" wide. The lockers measure 12" wide, 21" deep, and 15" high. The doors are equipped with spring hinges and padlock attachments.

Also available is a bench that features four lockers, four electrical receptacles, and in effect is the above bench divided in two.

For additional information write to the Parent Metal Products, Inc., 4th St. at Locust, Philadelphia 6, Pa., mentioning SCHOOL SHOP; or *circle no. M4 on the business-reply card.*

Jet Tools Feature Safety

Many safety features are claimed for the line of woodworking tools manufactured by Jet Tool, Inc. The complete line includes combination dado and moulding head, safety shaper collar, and an assortment of single, multipurpose, and blank blades.



The Jet safety collars and combination moulding and dado head include such safety and working features as double lock-in of blades, safety slots, edge-pin lock, and micro adjustment, the company asserts. It also points

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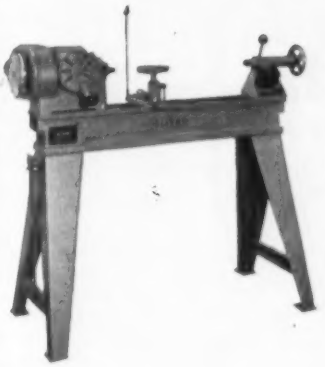

Students thrill to the even flow of power that assures smooth, accurate turning of all woods. This sturdy Oliver Lathe has unit type motor and V-belt drive headstock for spindle speeds of 800 to 2750 r.p.m. Swings 12" diameter, 26" between centers. Bed is 48" long. Spindle lock simplifies removal of face plates. Write for Bulletin 159A.

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out that Jet tools are precision made of finest quality, tough alloy steel, and are dynamically balanced for efficient, vibrationless cutting. They have the ability, the company states, to withstand sudden and accidental strains.

For more information write Jet Tool, Inc., Lemon Grove, Calif., mentioning SCHOOL SHOP; or *circle no. M5 on the business-reply card.*

Higgins Expands Drawing Ink Line

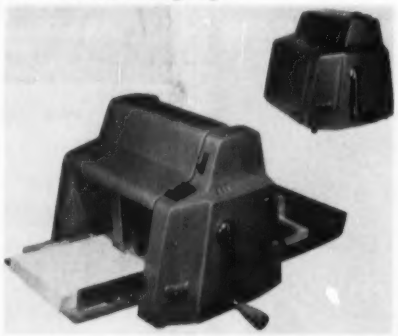
Two new waterproof black drawing inks have been added to the Higgins line and the Soluble Black India Ink has been reformularized, the firm recently announced.

One item, Higgins Acetate Ink, is for use on dull or prepared sides of acetate sheets and non-absorbent surfaces. Acetate ink is also intended for use on water-repellent tracing cloths and sensitized and developed papers and cloths. The company indicates the ink works with drafting and art instruments on the newer surfaces and preserves well.

The second new product, Super Black Waterproof Drawing Ink, is designed for art uses with a brush and pen. Super black is a high intensity black to complete drawings on high-surface bristol board.

Additional information is available by writing to the Higgins Ink Co., Inc., 271 9th St., Brooklyn, N.Y., mentioning SCHOOL SHOP; or *circle no. M6 on the business-reply card.*

Bohn Duplicator Announces Electric Mimeograph



A new electric mimeograph employing a different mimeograph principle has been announced by the Bohn Duplicator Corp.

Designated the M-4, the duplicator is designed like a printing press, the company states. The mimeograph's customary perforated drum and liquid ink have been discarded in this machine. Instead the M-4 uses two cylinders, an oscillating ink roller, and heavy printer's ink. According to the maker, the basic new design eliminates leaking ink, clogged drums, ink pads, inking with a brush, blurry copies, and ink-stained hands and clothes.

Included in the specifications are "printing press" features: three-minute color change, accurate registration, automatic cut-off counter, three-way copy adjustment, automatic feed for paper weight from tissue to cardboard and from post card to legal size. When not in use, it folds to a selfcontained dustproof case that occupies no more space than a typewriter.

For more information write to Bohn Duplicator Corp., 444 Fourth Ave., New York 16, N.Y., mentioning SCHOOL SHOP; or *circle no. M7 on the business-reply card.*

Hercules' "Swif" Solder Eases Soldering

A 50-50 tin-lead paste solder with flux has been introduced by the Hercules Chemical Co.

According to the manufacturer, the solder cleans, tins, and solders in one operation. It comes in two formulas: one containing flux for general work and the other (EE) containing noncorrosive flux for electrical work.

The firm states that Swif is applied before heating, thus freeing the hand that ordinarily applies the solder during heating. This allows the shop student to devote his full attention to the heating operation. The firm adds that Swif is of value to both shop and handicraft teachers; can be used in metalwork as well as electronics.

The company's specifications state the heat of a match (illustrated) is enough to solder thin wires and metal. From the standpoint of youngsters, the manufacturer claims, the soldering operation is simplified, making copper jewelry and other handiwork easier to grasp.

The product is available in several sizes up to three pounds. More information and a free sample are available by writing to Hercules

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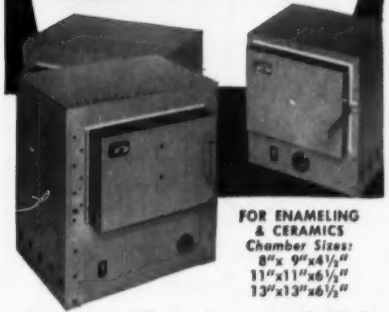

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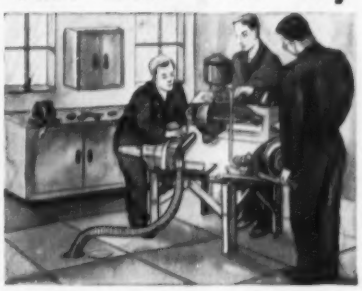

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Chemical Co., Inc., Department SS, 418 Broadway, New York, mentioning SCHOOL SHOP; or *circle no. M8 on the business-reply card.*

New Drill Press Utility Tray

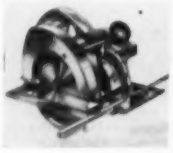
Patton Mfg. Co. has added a new item to its Champion line of products, it was recently announced.

Sold through Small Products Division of Patton, the T-10 drill-press utility tray is designed to aid drill press operators in regular shop work and to reduce needless motion in line drill operation, the manufacturer states.

The trays may be used to hold drills, wrenches, and other items that are frequently used with the drill press, the company adds. Trays are available in pairs or in right- and left-handed single units. The maker says they fit all standard 2", 2¼", and 3½" drill-press columns. Special trays may be supplied for drill-press columns other than standard.

For more information write to the Patton Mfg. Co., 1802 W. Pleasant St., Springfield, Ohio, mentioning SCHOOL SHOP; or *circle no. M9 on the business-reply card.*

Thor Power Tool Announces New Saw

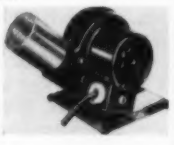


The new No. 450 Thor Power Speedsaw is designed to meet the requirements of builders and craftsmen, the firm announces. It features a 6½" rotary blade and can cut through 2 x 4 boards at angles up to 45°, the firm states.

Other important features of the tool include aluminum alloy die-cast housing which helps reduce its total weight to 12 pounds. The No. 450 also has an automatic telescoping blade guard which rides on anti-friction bearings. Critical moving parts are mounted on ball bearings and heat-treated alloy steel gears packed and sealed in grease plus the motor ventilation reduce heat when running. The motor operates at 5400 rpm on either a-c or d-c current. The saw comes equipped with combination blade and 10' of cable with grounding connector.

For additional information write to Thor Power Tool Company, Prudential Bldg., Chicago, Ill., mentioning SCHOOL SHOP; or *circle no. M10 on the business-reply card.*

Master Appliances Announces New Unit



A new unit for blowing electrically-heated air has been announced by Master Appliance Manufacturing Company.

According to the firm, the new blower is designed for continuous duty and will quickly heat air for the purpose of accelerating drying processes for localized heating. The air temperature at the nozzle is 300° fahrenheit and the air volume is 50 cubic feet per minute. The air velocity, the firm states, is 2000 feet per minute, B.T.U. is 3400, and wattage is 1000. The unit can be plugged into any regular 115-v, 60-cycle, a-c (only) outlet.

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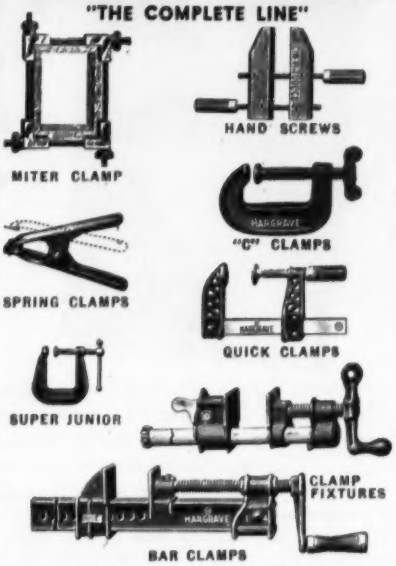

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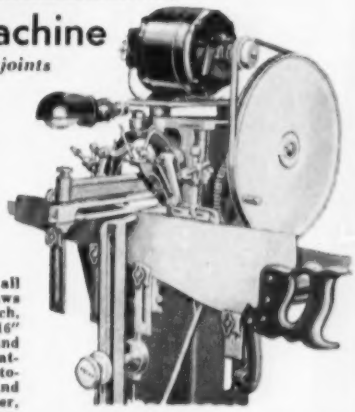

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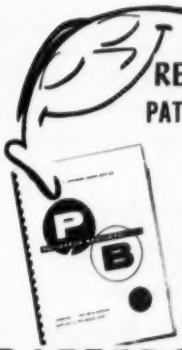

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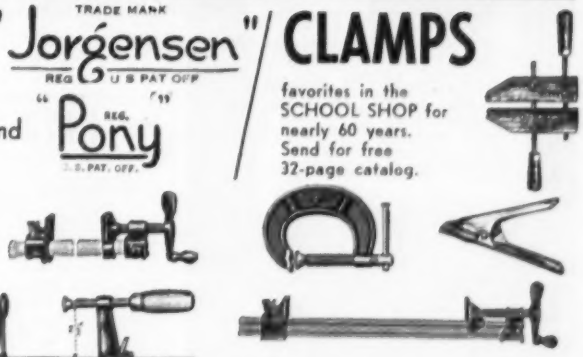

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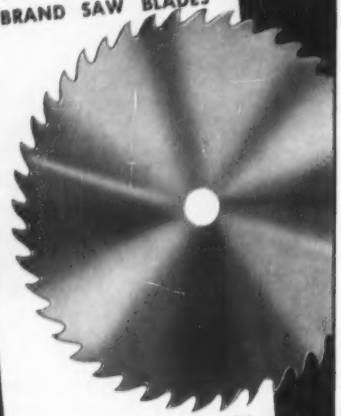

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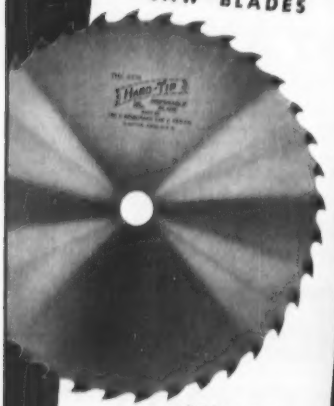

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Modern Shop Furniture is a new catalog published by the Stoner Wood Products Co. that contains information on the firm's line of school-shop furniture. It shows furniture and fixtures for all shops, whether woodworking, metal, or drafting. The catalog is well illustrated with drawings of what the company has to offer. For a copy of the catalog write to Stoner Wood Products Co., Charleston, Ill., mentioning SCHOOL SHOP; or *circle no. M13 on the business-reply card.*

Catalog No. M-1961 is the Cincinnati Milling Machine Co.'s new publication that covers its various lines of current products. The catalog contains 71 pages of illustrated data on the firm's tools and machines. Attractively made up using several colors on the cover, as well as inside, the book contains detailed data that would be of value in considering new equipment. To request the publication write Cincinnati Milling Machine Co., Cincinnati 9, Ohio, mentioning SCHOOL SHOP; or *circle no. M14 on the business-reply card.*

Everything for Student Draftsmen is the title of the 1956-57 Keuffel and Esser special school-edition catalog. The 14-page publication contains illustrations and pertinent information about the drawing instruments and equipment handled by the firm. List prices are given for each item shown. With it is a corresponding "school price." The catalog can be obtained by writing to Keuffel and Esser Co., 300 Adams St., Hoboken, N.J., mentioning SCHOOL SHOP; or *circle no. M15 on the business-reply card.*

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Washington . . . . . *from page 48*

year. How could we possibly compete or want to compete with the vast vocational-education machinery?"

Here Mr. Christensen enunciated a clear and categorical policy which, if our notes are correct, is as follows:

"The Bureau of Apprenticeship does not want to, and does not plan to, provide or offer training courses or training facilities to industry. What we want to do is stimulate industry and labor to become aware of training needs for all employed workers. And as we do that we give the vocational schools more business—we help vocational education."

Have there been any instances where apprenticeship people have offered or promised training facilities?

Yes, admitted Mr. Christensen. Now and then some zealous field representative will tell an employer that the Labor Department will provide training—that is, continuous sessions of help and instruction. "Such a man is off base, out of line," the director insisted. "He does not speak for the Bureau or for Washington." But because such isolated instances take place—and they happen very rarely—is no reason to condemn the entire Bureau, Mr. Christensen pleaded.

During the course of our conversation, Mr. Christensen made these points:

1. He charged that "all this letter-writing to Congress," in effect, these lobbying activities against a government agency, was done partially at least with federal money. He reasoned that since state and local vocational educators are supported, in part, by federal dollars, "it cost the federal government to have this pressure brought against the federal Bureau of Apprenticeship."

2. He deplored that "this hassle" between two types of vocational-education services has reached "this stage." Said Mr. Christensen: "The taxpayers, industry, and business are not going to be pleased to see their public servants fussing . . . So big are the training needs and so huge a task lies ahead that if all agencies of government combined they still couldn't provide as much

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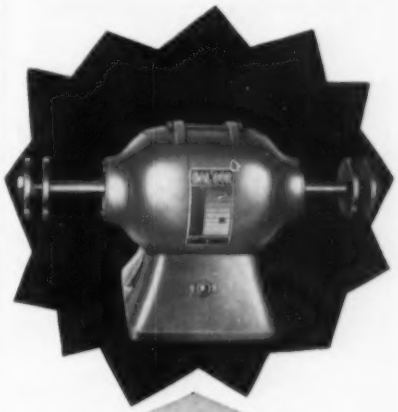

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training as is needed in the United States today."

3. Finally, Mr. Christensen pointed out that the Bureau of Apprenticeship at all times looks to the vocational schools as the indispensable partner in training—and says so in all its official Washington pronouncements. Even after this incident, Mr. Christensen indicated, his agency will simply try to get "the misunderstanding clarified" so that a degree of cooperation can be achieved. He has already asked for a conference between representatives of the American Vocational Association, the Office of Education, and himself—but at this writing he hasn't succeeded in having a date set for the meeting.

Painful though it was, it appears that the Bureau of Apprenticeship has learned a lesson. The agency will think long and hard before again coming before Congress with proposals covering training. It also appears likely that Washington officials may slap down any field apprenticeship agent who goes deeper into training beyond "the demonstration session" in a factory or plant, pointing out the value of training. Perhaps, too, the Labor Department may now be sensitive to the experience of Europe, where, qualified observers report, trade and industrial education suffers because responsibility for its promotion has been split between the ministries of labor and education. It's only recently that England has concentrated responsibility in the ministry of education.

Vocational education has won a clear-cut victory. But upon victors fall heavy responsibilities. In this instance, vocational educators will not only have to secure the peace between apprenticeship and trade training. They will also have to extend training opportunities into those vacuums where the Bureau of Apprenticeship has been pushing—for the very reasons that the vacuums existed.

New Developments.—Now for some other Washington developments as much as space will allow:

✔ Hope for passage of a federal school-construction bill is fading. During the past 30 days, foes of federal aid have delivered strong blows against the proposal in principle. Their argument has been: The states and local communities can build all the classrooms needed without federal dollars.

The demand to keep federal expenditures down is also working against the bill. And the threat of the Powell amendment is keeping even such stalwarts as Sen. Lister Hill of Alabama from doing battle for the measure. At this moment,

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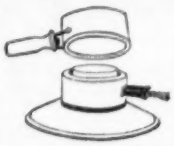

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federal aid has more foes than friends in Washington.

But Congress seems to love that library services bill. Last year Congress enacted a proposal to aid rural libraries. The full amount which can be spent a year was set by the law at $7,500,000. But the Bureau of the Budget has been cautious—permitting the Office of Education to ask only $3,000,000 for next year. The House appropriations committee, however, raised the figure to $5,000,000—an unprecedented step.

And speaking of the unusual, Chairman Fogarty of Rhode Island, who controls the purse strings for education as head of the House appropriations subcommittee, exchanged these words with newly-named U. S. Commissioner of Education Derthick:

CHAIRMAN FOGARTY: "The salaries paid to some of your people in the Office of Education make it pretty difficult to hire a good staff. I don't think it's right to ask a person with your background to come to Washington and work for $16,000 a year. I just told the Secretary (of Health, Education, and Welfare) that I hoped he would have some success in seeing to it that not only your salary is raised, but other salaries in the Office are raised so that we can hold the good men and attract others."

DR. DERTHICK (Obviously overwhelmed): "Well, now, Mr. Chairman, I believe in my more than 50 years I never heard such a statement from a man in your position. It is wonderful."

Meanwhile, a good man who would work for $21,000 a year joined the Department of Health, Education, and Welfare. He is John Perkins, up until recently president of the University of Delaware. Dr. Perkins became Under-Secretary. Being aggressive, young (42), and with individualized ideas about education, Dr. Perkins may do more than his predecessor, Herold Hunt, to keep his finger on—or perhaps even in—Office of Education affairs. "We may come to have two Commissioners of Education," one worried federal educationist said.

And by the time you read this, plans for the first conference on vocational-technical education to be held in Washington may well be completed. Trade and Industrial Education chieftain John Walsh plans to hold this conference May 13 through 17. Some 24 experts are expected to arrive in search of a definition of vocational-technical education. When they find it (there is no question that they will), they will share it with the rest of the country by means of a report to be published soon. ★

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from Washington

by Michael Paca

A Blockbuster.—With precision in timing and with a power that was devastating, vocational educators dropped a blockbuster on the Federal Bureau of Apprenticeship — that same bureau which had aspired to add to its name the words ". . . and Training." So powerful was the blow that some observers wonder whether something more than the Bureau of Apprenticeship has been damaged. Certainly, an effort that would have resulted in an increase in training-consciousness has been snuffed out.

In January, the Administration sent to Capitol Hill a budget request for an extra $300,000 for extending the Bureau of Apprenticeship's activities into the direction of training beyond that concerning apprentices. In February, Secretary of Labor Mitchell justified the request before the House subcommittee on appropriations. In March, the full committee gave its verdict. It denied the Bureau's request for the extra money; deleted the words "and Training" from the Bureau's proposed new name; and refused the Bureau authority to expand into the field of training. The committee said:

"Many members of Congress have expressed concern that this proposed program was getting into the field of vocational education. The committee has, therefore, deferred the possible extension of the program until it has more conclusive evidence of whether or not this concern is well founded."

Behind the "many members of Congress" who had expressed concern were more vocational educators who had expressed even greater concern over the Bureau's intent to go over into "an action phase" touching on training. This became evident during February and March. Congressmen and Senators began receiving letters asking: What authority does the Apprenticeship Bureau have to extend its interest into training? Typical was a protest from H. M. James, Maryland state supervisor of industrial education.

As included in the official transcript of the hearings, this letter said in part: "I am opposed to the promotion, development, and adoption of plans and programs by the Bureau of Apprenticeship to include programs other than those provided for in the Fitzgerald Act . . . We want the Department of Labor to expand its apprenticeship program. We insist that the Bureau of Apprenticeship carry out, on an expanded basis, the job it was created to do, rather than take on another job which it has no legal authority to do."

Unkind and Unfair.—We now go to the U.S. Department of Labor and to the office of the man who felt the crushing "No!" of Congress most sharply and personally. He is William "Chris" C. Christensen, director of the Bureau of Apprenticeship. Mr. Christensen was born, raised, and educated in Wisconsin, where his father spent many years as a vocational educator. Mr. Christensen is personable, and speaks with clarity and conviction. Above all, he appears sincere and dedicated to the cause of raising the skills of those who labor in industry and business.

The decision of the House committee disturbed Mr. Christensen hugely. He was probably more disturbed by the forces that led to the committee's decision. By that he meant "the organized campaign" that prompted so many state and local leaders to flood Capitol Hill with protests against the Bureau's training aspirations.

"It's unkind, it's unfair," repeated Mr. Christensen. At one point he struggled toward a stronger condemnation, but he held back.

"We are not empire builders," he continued. "We're a small organization. We have only 242 professional or technical men in the whole of the United States. Our budget is less than $4,000,000 a

(*Continued on page* 45)

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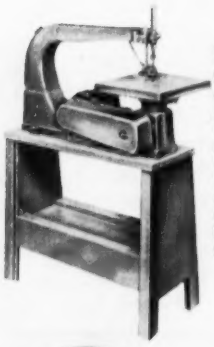

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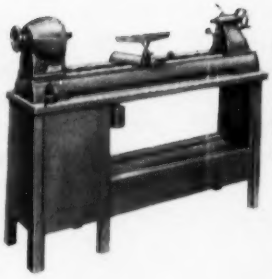

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